# THE SEAMANS KALENDER, OR

An Ephemerides of the Sunne, Moon, and certaine of the most notable fixed Starres.

The fifth edition, newly corrected and enlarged, with an abridged Table of signes, and some propositions thereupon, concerning Arethmeticall Nauigation.

LONDON.
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1615.

BRITISH MUSEUM

# To the Right Worshipfull Sir John Paiton Knight, Gouernour of his Maiesties Ile of Iersey, I. T. wisheth worlds pleasures, and heauens happinesse.

THe *Bee* (Right Worshipfull) by serious industry gathering a certaine hidden vertue from sundry sortes of flowers and hearbs, and making thereof (by labour and trauaile) a materiall Lumpe, namely the Hony combe: is not therefore to be condemned by any, but rather highly commended of all. The Phisition, of many simples making one compound medicine, doth not onely thereby reap profit to himselfe, but applauditie of others. And the studious Reader, out of many Authors doth select some cheefe principles which hee recordeth as memorials, either to profit himselfe or to pleasure others.

Of these three comparisons, the first is excellent for immitation in generall, the second very necessary for diuers in perticular, and the last, (though not so highly esteemed of the common sort of people by reason of their ignorance in Artes and Sciences, yet for the good that may come thereby to a common-wealth) nothing inferiour to the best: especially, where their study tendeth to good and vertuous exercises, or the practise and contemplation thereof to laudable Artes and Sciences. Of which Artes, namely *Mathematicall*, Nauigation being a principall member, as hauing participation in *Atithmeticke*, *Geometrie*, *Geography*, *Cosmographie* and *Astronomy*, or rather to say the truth, beeing the quintessence of them all, yea the proofe and tryall of them: for albeit that men reade or heare neuer so much of *Cosmographie* or *Astronomie*, yet without practise and experience it is vnperfect: and how can perfection be attained but by sayling and transporting from place to place, thereby beholding the diuertsiies of dayes and nights, with the temperature of the Ayre in sundry Regions, whereby the whole course and reuolution of the Spheare is made

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apparrant to mans capacitie? and by what meanes can Sayling be performed but by Nauigation? which so being, it may be affirmed that as the *Mathematicall* Sciences are the grounds of Nauigation, so is Nauigation the onely meanes, whereby the excellency of those Artes and Sciences, are prooued and layde open to the view of the world. Therefore very aptly may Artes be tearmed the mirrour of nature, because that by Artes, the wonderfull and hidden secrets of nature are reuealed: And Nauigation may bee called the tryall of Artes, being that thereby the whole studie of Artes is prooued to be true. These reasons moouing mee, as also being many times conuersant with Sea-men and Marriners, whereby I perceiued what they (I meane the common and plainer sort of them) chiefly desired: at my best leysure I made a collection of such Tables and rules, as I thought fittest for their purposes: and being instantly vrged by diuers to publish them, although I was very loath to aduenture my simple labours to the common view of carping censurers: yet at last (hoping well of the best, and not greatly respecting the worst) I resolued to hazard my papers to the presse, and my selfe (as the common custome of the world is) vpon the Patron, to protect it from the malitious slaunders of malignant spirits, I presumed vpon your Worships fauour in two respects: the one in consideration that your selfe being so well acquainted in the Artes *Mathematicall*, would (though not in respect of the Author, yet for affection of the matter) vouchsafe the protection of them. The other, that being in dutie bound to be at your Worships pleasure, I know not how I might shew my selfe dutifully affected, better then by dedicating my (though vnpolisht, yet well willing) labours to your fauourable disposing, beseeching your Worship to accept of them, and to pardon my boldenes: and so with my daily prayers to God for your health and prosperous successe in all your actions, I rest.

*Your Worships, most dutifully to be commanded* Iohn Tappe.

# To the Courteous Readers health.

GEntle and indifferent Readers, whoſe iudgements are not ſo ſophiſtically mixed with humorous conceites, and quiping quidities, (as many are now a daies) who are apter with their turbulent tongs to condemne all thinges, then with ſenſible iudgements to amend any thing: as for them or any ſuch carping Zoyliſtes, I am indifferently perſwaded to ſet as lightly by their partiall and iuduciall cenſures, as they are farre from hauing a good opinion of ought but what is agreeable to their owne fantaſticall fictions: Onely to them that are of more plauſible ſpirits and grauer iudgements, who (for the moſt part in reading) applaude that which is good, and paſſe ouer with ſilence that which is not hurtfull, without ſcoffing at the worke, or deriding the Author: and to thoſe that hauing ſmall vnderſtanding, are deſirous of more knowledge in the art of Nauigation, and other Mathematicall ſtudies: To the one I commit the cenſuring of my worke, and to the other the profit of my labors: knowing that the wiſe will rather winke at ſmall faultes, then raſhlye reprooue that which may profit others, though not pleaſure themſelues: and though (as I ſay) the curious and expert Mariners finde nothing heerein contained which may ſatisfie their expectation, yet I hope they will iudge fauourably of my intention, and

with patience passe it ouer for affection to the Arte it selfe, wish charitablye that my skill were answerable to my will: as for the meaner sort whose experience haue not beene taxed with Artes rudiments, nor their iudgements fined with demonstratiue illustration in the Mathematicall Sciences, but onely are now (as it were) setting themselues with willing mindes to learne what they before wanted, I make no question, but as by these following Tables and Propositions they reape profit: so accordingly, inyeelding friendlye censures vpon me & my workes, they shall answer my expectations with a full recompence of my passed labours. And so I leaue thee friendly Reader, to the Practise of what-

followeth: hoping that as it may be profitable to all, so it can no way be hurtfull to any.

*Yours to vse*: I. T.

# Certaine definitions, meete to be vnderstood of those that will practise Nauigation.

A Spheare or Globe, is a round figure, made by the turning of halfe a Circle, till it end where it beganne to bee mooued, or a massie body inclosed with one platforme or surface: in the middle whereof is a pricke, from which all lines drawne to the surface, are equall.

Center is the point or pricke aforesaide, in the middle of a Spheare, Globe, or other Circle.

Diameter is a right line, drawne through the Center, to the Circumference or surface of a Spheare or Circle to each side thereof.

Circumference, is a round Circle, equally, distant on all sides, from the Center thereof.

Surface or Superficies, is the vpper part of any thing.

A Degree is the 360. part of the circumference of any circle.

A Minute is the 60. part of a Degree, being vnderstood of measure: but in time, a minute is the 60. part of an houre, or the fourth part of a degree. 15. degrees answering to an houre, and foure minutes to a degree.

The Pole is a point or a pricke immagined in the heauens, whereof are two, the North Pole and the South Pole, opposite one to another: the North Pole being the center to a circle, described by the motion of the North Starre, or the taile of the little Beare: From which point aforesaid, a line immagined to passe through the center of the earth, and passing directly to the opposite parts of the heauens, sheweth the South pole.

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The Equinoctiall, is a great circle imagined in the heauens: also deuiding the heauens into two equall partes, and lying iust in the middle betweene the two Poles, being in compasse from West to East, 360. degrees, euery degrée of terrestriall measure, valewing 20 english leagues or 60. miles.

The Meridian is a great Circle deuiding the Equinoctiall at right angles into two equall partes, passing also through both the Poles and the Zenith: to which Circle, the Sunne comming twise euery 24. houres, maketh the middle of the day, and the middle of the night.

Note that euery place hath a seuerall Meridian, which doe all meete together in the Poles of the world.

Zenith, is a point or pricke in the heauens, right ouer our heads, 90. degrées from the Horizon, as the Pole is 90. degrées from the Equinoctiall.

Nadir, is a point or pricke in the heauens vnder our féete, opposite to the Zenith.

Horizont, is a great Circle deuiding that part of the hsauens which we sée, from the other part we sée not.

Azimuth, is a great Circle, crossing the Horizont at right angles as the Meridians do the Equinoctiall, being many as the Meridians: and as the Meridians concurre and meete together in the Poles of the world, so do the Azimuthes meete in the Zenith, which is the Pole of the Horizon.

Paralels, are lines or Circles equally distant in all parts one from another, as all circles of East and West are paralell to the Equinoctiall.

Almicanterahs, are Circles paralell to the Horizon, beeing also Circles of Latitude or eleuation, being that the altitude of the Sunne, Moone, or Starres aboue the Horizon are described thereby: which Almicanters doe crosse the Azimuthes, as the Paralels or Circles of East and West doe crosse the Meridians.

The Tropickes are twe lesser Circles paralell to the Equinoctiall limitting the bounds of the Zodiacke or the greatest declination of the Sunne on each side of the Equinoctiall. The Tro-

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pick of Cancer northward, and the tropicke of Capri. southward. whose distance from the said Equinoctiall are 23. degrees, 30. mi.

The Zodiack is a great Circle, crossing the Equinoctial in two opposite places thereof, and swaruing Byas wise there from, towards either of the Poles, touching the tropicke of Can. on the north part, & the tropick of Cap. on the South part therof. In the Zodiack are the 12. signes, viz. Aries, Taurus, Gem. Can. Leo. Vir. Libra, Scor. Sagi. Capri. Aquar. Pisces, euery signe being 30. deg. in length, & 12. in bredth: through which signes the Sun passing, describeth a yeare, and the Moone passing likewise through the same makes a month: the 12 degrees that the Zodiacke hath in bredth, is allowed for the latitude of the Planets.

Eclipticke, is a circle lying iust in the middle of the Zodiack, out of which the Sunne neuer goeth, but the Moone & the other Planets are some time on the one side, and sometime on the other side thereof, in which the head and taile of the Dragon also is.

The head and taile of the Dragon are two opposite pointes in the Ecliptick line of the Zodiack, which goeth backward through all the 12. signes in 19. yeares: and when it happeth that the Sun and Moon are in coniunction, in that place of the Ecliptick where the head or taile of the Dragon is, then is the Sunne eclipsed, & being in the opposition, the moon being in either of the said points the Moone shall be eclipsed.

The Circle Articke, is a circle which incloseth all those starres which do neuer rise or set in any Latitude, but are alwaies aboue the Horizon where the North Pole is raised: the like is vnderstood of the Circle Antarticke, where the South Pole is raised.

The Polar circles, are two little Circles distant from the poles of the world, so much as is the greatest declination of the Zodiacke from the Equinoctiall: in which Polar circles are the Poles of the Zodiacke.

Colures, are two great circles passing through both the poles, crossing one an other in the said Poles at right angles, and deuiding the Equinoctiall and the Zodiacke into foure equall parts, making thereby the foure seasons of the yeare. The one Colure passing through the Equinoctiall pointes of Aries & Libra, shew

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eth the beginning of the Spring time and Autumne: which two times the daies and nights are equall. The other Colure passing through the two tropicall points of Cancer & Capricorne, sheweth the beginning of the summer & winter: at which two times, the dayes and nights are longest and shortest.

Altitude in the heauens, is the height of any thing aboue the Horizon towards the Zenith.

Latitude is the widenes or distance of the planets or starrs, from the Ecliptick, eyther northward or southward. Also Latitude is the distance of the Zenith of any place from the equinoctiall, towards eyther of ỳ poles, which is alwaies equall with the height of the Poles of the same place.

Longitude is length, and in the heauens it is vnderstood the distance of any Star or Planet, from the beginning of Aries to the place of the said Planet or starr, or from the beginning of any signe to a certaine other parte or degrée of the same signe: Otherwise, longitude in the earth, is the distance of the meridian of any place, from the Meridian which passeth ouer the Iles Azores: where the beginning of longitude is said to be: Longitude, is counted vpon the equinoctiall, and latitude vpon the Meridian.

Declination is the declination or distanee of the Sun, Moone or Starres from the equinoctiall, and is said to be North or South according to the Pole towards which it leaneth.

Amplitude is the distance of the rising and setting of the Sun, Moon, or Stars, from the true east or west point of the Compas vpon the Horizon.

Ascension is the rising of any Star, or of any portion of the Ecliptick aboue the Horizon, right ascention is the nomber of degrees and min. of the equinoctiall, which commeth to the Meridian with the sun, Moone, starr, or any portion of the ecliptick. Oblique Ascention is the nomber of deg. of the equinoctiall, which riseth or commeth to the Horizon with the sun, moon, starr, or any portion of the ecliptick, in which sort is oblique descention, also Ascentionall difference is onely the remainer, the one being substracted or taken from the other.

The Golden nomber or Prime, is the time of 19. yeares: in which

which time the Sunne and Moone maketh all varietie of their coniunctions, Oppositions, and other Aspects,

Epact is the 11. daies and three houres, which are added to the yeare of the Moone being 354. daies, to make it equall with the yeare of the Sunne, which consisteth of 365. daies, and ¼. By the Prime is found out the Epact: and by the Epact is found out the age of the Moone,

The Circle of the Sunne is the nũber of 28. because that in 28. yeares, all the variety of Dominicall or sunday letters and leape years, are expyred, being that at the 29 yere, the said Circle doth begin again: the vse of the which number is to finde out the dominicall Letter for any yeare past, present or to come. Where note, that ther is but 7. letters which serue for sunday letters, viz. A B C D E F G, And albeit that in the daies of the wæk, they proceed according to their natural order of the Alphabet, yet in the yeres they go backward: as if G. be for one yeare. F. shal be for the next: & when it is leap yeare (which is euery fourth yeare) then is there two Letters for the yere, the first seruing from the first of January till S. Mathias day, which is then the 25. of Februarie, and then the other letter takes place, & serues till the end of the yeare.

To finde which number of the Sunnes circle, and consequently the Dominical letter for the yeare proposed, to the yeare of our Lord, adde 9. that totall deuide by 28. and that which remaines is the Circle of the Sunne for that yeare: Then to know the Dominicall letter, note that the 28 yeare the Dominical letter is A. and is the third from the leape yeare: therefore the first to begin withall againe, is G F. because it is another leape yeare, and so counting the 7. letters backward, and euery fourth yeare counting two letters, that letter vpon which the number of the Suns circle endes, shall be the sunday letter for the yeare proposed.

As for example: the yere 1614 adding 9. therto, it makes 1623 that being deuided by 28. the remainer is 27. the circle of the Sunne: then counting the 7. letters backward till I haue counted 27. places, beginning with G F. thus, 1. G F. 2. E. 3. D. 4. C. 5. B A. 6. G. 7. F. 8. E. 9. D C. 10. B. 11. A. 12. G. 13. F E. 14. D. 15. C, 16. B, 17, A G, 18. F. 19. E. 20. D. 21, C B. 22. A. 23. G. 24. F. 25. E D.

25. ED. 26. C. 27. B. I finde that the 27. place endes vpon B. which I conclude to be the Dominicall letter for the yeare aforesaid: and it is the second yeare after the leape yeare.

And here is to be noted, that the Prime and Dominicall letter, changes the first day of January, & the Epact the 1 day of March.

To finde out the Prime.

Deuide the yeare of our Lord by 19. and to that which remaineth after the deuision, adde one: the product is the prime number for all that yere. As for example.

I would know the Prime for the yeare 1616. deuide 1616. by 19. and you shall haue in the quotient 85. and after the deuision, there rests 12. vnto which if you adde one, it makes 2. which is the Prime for the yeare 1616.

To finde out the Epact.

Adde to the Epact of the yeare past 11. and if it passe 30. take away 30. and the product is the Epact for all that yeare: but otherwise, which is the better way: immagine three places vpon your hand, which for example let it be the 3. ioyntes of one of your fingers, & call or name the first ioynt 10. the second 20. the third 30 then count the prime number vppon the three ioyntes aforesaid, and going ouer them vntill you come to the end of the said Prime number, marke vppon which your Prime ends, and adding the number of the ioynt with the Prime, if they come not to 30. that shall be the Epact for all that yeare: if they passe 30. take away 30. and the remainer is the Epact.

As for Example.

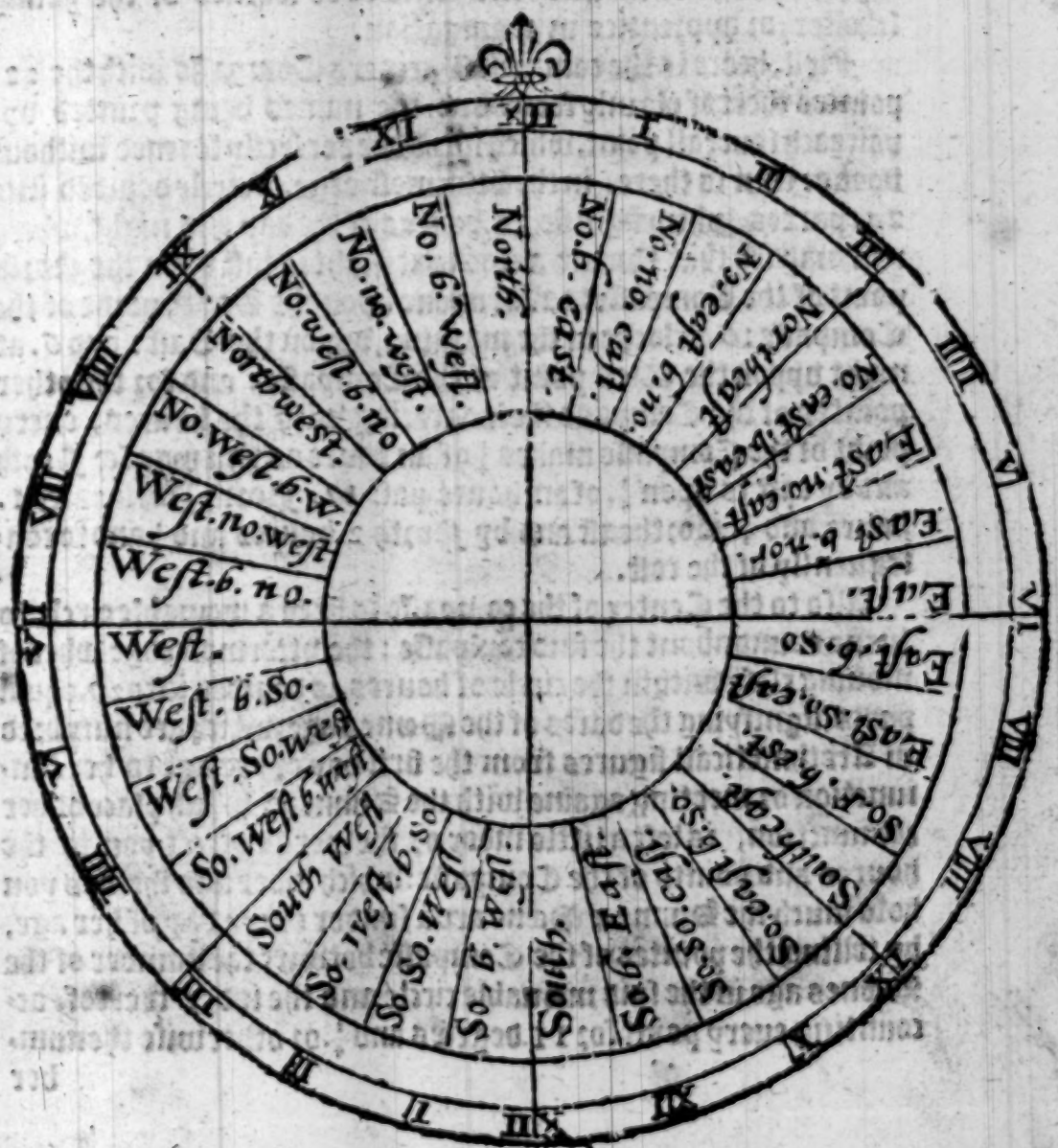
The yeare 1616. the Prime is 2. and immagining the first ioynt of my finger to be 10. the second 20. the third 30. I count vppon the three ioynts 2. the Prime number, viz. vpon the first ioynt I tell 1. on the second 2. to 15. which is the Prime ending vpon the second ioynt which I cal 20. therefore adding 20. the number of the second ioynt to the Prime 2. makes 22. which is the Epact also for the yeare 1616.

To know the Moones age.

Adde to the day of your Month, the Epact, and so many daies more as are months frō march to the month you are in, including both

both monthes, and if they come not to 30. so much is the Moones age: but if they passe 30, take away 30. and the ouerplus is the Moones age.

This is when the month hath 31. daies, but if the month hath but 30. daies, you must take away but 29. and the rest is the age afore said: for in those monthes that haue 31. daies, the Coniunction is the 30. day of her age, and in those monthes that haue 30 dayes the Coniunction is the 29. day of her age.



## *A declaration of the former Instrument.*

THis instrument giues you a plaine and easie order, for the shifting of the Sunne and Moone for euery day of her age, and also it is a readie and most necessarie reccning of the tides, whereby also is showne the common order to bring thereby the 32. points of the Mariners Compasse to 24. houres of the day & night, which are the first rudiments to be learned of the young scholler, or apprentice in Nauigation.

First, heere is the common Mariners Compasse with the 32. pointes thereof plainly set downe, the names being printed vpon each seuerall point, which must bee perfectly learned without booke: then is there, in the vttermost edge, a circle deuided into 24. partes, which signifie 24. houres of the day and night, where you may see that twelue a clocke at night is iust vpon the North point of the Compasse: 12. at noone vpon the South point of the Compasse: 6. a clocke in the morning, vppon the East: and 6. at night vppon the West point of the Compasse: and for the other pointes of the Compasse their agreeing with the houres, euery point of the Compasse makes $\frac{3}{4}$ of an houre as you may see North and by east is vpon $\frac{3}{4}$. of an houre past 12. North Northeast, 1. houre and $\frac{1}{2}$. Northeast and by North 2. houres and $\frac{1}{4}$ and so consequently of the rest.

Also to the Center of the compasse is fixed a mouable circle to turne round about the said compasse: the vttermost edge whereof mouing close within the circle of houres, is deuided into 29. equal parts, signifying the daies of the Moones age, which are numbred in Arethmeticall figures from the first day of her age to her coniunction or meeting againe with the Sunne: at which place of her coniunction, is left a little inder or shewer to direct you to the houres and points of the Compasse: which inder also shewes you how much the Sunne & Moone are a sunder euery day of her age, by telling the pointes of the Compasse betwixt the number of the Moones age in the said mouable circle and the inder thereof, accounting euery point for 11. degrees and $\frac{1}{4}$. or otherwise the num-

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ber of houres contained in the vttermoſt circle, betwixt the ſaid number of the Moones age & the inder: accounting euerie houre for 15. degrees, ſhewes the degrees of diſtance betwixt the Sun and Moone.

Now to keepe a recconing of the tides thereby, you muſt know by the table heerafter ſet for that purpoſe, how it flowes, that is to ſay, what Moone makes full Sea or high water at that place where you would know the time of the tide or high water for the day propoſed: which knowne, you muſt alſo by the former propoſitions, or elſe by the Kalender following, know the Moones age: then ſeeking out the number of the Moones age in the moueable Circle, place the ſaid number of the moons age vpon that point of the Compaſſe which makes full ſea vpon the change day at your place deſired, and ſtaying it there, the inder which is in the ſaid moueable Circle, points you directly to the point of the Compas that the Sunne muſt be vpon, when it ſhall be high water the foreſaid day in the deſired place, and alſo in the vttermoſt fixed Circle it ſhewes the houre of the day which you deſire.

An example.

The firſt of Januarie 1616. I deſire all this aforeſaid: Firſt for the Moones age becauſe that the Epact changes not til the firſt of March, I adde the Epact of the laſt yeare, which is 11. & the day of the month 1. is 12. then January being the eleuenth month from March, & 11. added thereto makes 23. for the Moones age the firſt of January. 1616.

Againe, to know how much the Sunne and Moone are aſunder, the Moon being 7. daies old, I ſeeke in the moonable Circle for the Moones age, which being 7. I place 7. vpon any certaine point of the Compaſſe, which for example is heere weſt, and the inder ſhewes the North and by weſt, and $\frac{3}{4}$ to the Northward, which is 7, points & $\frac{3}{4}$ that multiplyed by 11. $\frac{1}{4}$. makes the number of deg. that belong to a point 87. deg. for the diſtance betwixt the Sun and Moon, and in houres it ſhewes 5, $\frac{3}{4}$ which multiplyed by 15. yeelds the like being very neere $\frac{1}{4}$ of the Zodiacke.

Then for the tides, at London Bridge it flowes Southweſt

and

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ber of houres contained in the vttermoſt circle, betwixt the ſaid number of the Moones age & the inder: accounting euerie houre for 15. degrees, ſhewes the degrees of diſtance betwixt the Sun and Moone.

Now to keepe a reccning of the tides thereby, you muſt know by the table heerafter ſet for that purpoſe, how it flowes, that is to ſay, what Moone makes full Sea or high water at that place where you would know the time of the tide or high water for the day propoſed: which knowne, you muſt alſo by the former propoſitions, or elſe by the Kalender following, know the Moones age: then ſeeking out the number of the Moones age in the moueable Circle, place the ſaid number of the moons age vpon that point of the Compaſſe which makes full ſea vpon the change day at your place deſired, and ſtaying it there, the inder which is in the ſaid moueable Circle, points you directly to the point of the Compas that the Sunne muſt be vpon, when it ſhall be high water the foreſaid day in the deſired place, and alſo in the vttermoſt fixed Circle it ſhewes the houre of the day which you deſire.

An example.

The firſt of Ianurie 1616. I deſire all this aforeſaid: Firſt for the Moones age becauſe that the Epact changes not til the firſt of March, I adde the Epact of the laſt yeare, which is 11. & the day of the month 1. is 12. then January being the eleuenth month from March, & 11. added thereto makes 23. for the Moones age the firſt of January. 1616.

Againe, to know how much the Sunne and Moone are aſunder, the Moon being 7. daies old, I ſeeke in the moouable Circle for the Moons age, which being 7. I place 7. vppon any certaine point of the Compaſſe, which for example is heere weſt, and the inder ſhewes the North and by weſt, and $\frac{3}{4}$ to the Northward, which is 7, points & $\frac{3}{4}$ that multiplyed by a 11. $\frac{1}{4}$. makes the number of deg. that belong to a point 87. deg. for the diſtance betwixt the Sun and Moon, and in houres it ſhewes 5, $\frac{3}{4}$ which multiplyed by 15. yeelds the like, being very neere $\frac{1}{4}$ of the Zodiacke.

Then for the tides, at London Bridge it flowes Southweſt

and

and nor-theast, or is high water at 3. a clocke on the change day: therefore when the moone is 7. daies old. I place 7. the moones age, vpon the point southwest 3. a clocke, and staying the moueable rundle there, I see that the inder shewes almost nor-thwest, which is 35. min. or neere ½ quarters of an houre past 8. of the clocke, at which time it shall be high water at London bridge, the moone being 7. daies olde.

Againe, at Harwiche where it flowes south and by east, the Moone ten daies old, I lay ten (the Moones age) vpon the point of the compasse South and by east, and then the inder shewes the point west nor-th-west of the compasse, and in the circle of houres ½ houre past 7. which is the time of the full Sea at harwiche, the Moone being ten daies olde.

But if you want a Table or instrument to wor-ke the account of the tides, you may doe it by memorie, multiplying the Moons age by 4. and deuide the product by 5. and to the quotient adde for euery vnity which remaines vpon your diuision 12. mi. that total adde to the houre that it makes full sea on, vppon the change day, the product shall be your desired number, as in the first example.

The Moone 7. daies old, and the high water at London on the change day, at 3. of the clocke. I multiply 7. (the Moones age) by 4. makes 28. that deuided by 5. the quotient is 5. and 3. remains vpon the diuision, which 3. being so many times 12. minu. makes 36. minu. and added to 5. in the quotient, makes 5. houres 36. mi. that added to 3. the houre of full sea vpon the change day, makes 8. of the clocke and 36. minutes as aforesaid.

## The gouernment of the Planets.

DIuers writers haue disagreed, concerning the planetarie houres, some making the houres of the Planets equall with the houres of the clockes, & so continuing their Regiment orderly with the other common houres. Some againe, beginning the said Planitarie houres at noone, some at midnight, and some againe at the Sonne rising: which indeede for the time of the beginning of the account is the best, & for the difference of the equalitie & inequalitie betweene the Planitarie houres, & the common houres of the clockes, Gemma Frisius agreeing with ỳ best Astronomers.

nomers saith, that as the daies & nights do increase or decrease, so must the planetary houres be longer or shorter accordingly, nevertheless so that there shall be 24. planetarie houres in the day and night, as well as of other houres, but that if the day consist of more thē 12. houres, thē proportionally the planetarie houres to consist of more then 60. minutes, and if the day be lesse then 12. houres, thē the planetarie houres, to be lesse then 60. minutes: & if the day be iust 12. houres, then the planetarie houres are equal to the houres of the clockes and not otherwise. The like is to be vnderstood of the nights: & to make an equalitie of the planetarie houres to them of the clockes, being that how long soeuer the day is, yet there must be 12. planetarie houres: and how short soeuer the day is, there must (nevertheless) be 12. planetarie houres, and so of the night, by which you sée that the planetarie houres are sometimes greater and somtimes lesser then the common houres of the clockes, which alwaies consist iust of 60. min. therefore if you deuide the day into 12. equall parts, one of those parts shall be the quantitie of a planetarie houre, which you may doe thus: multiply the houres of the day into minutes by 60. & if there be any odde minutes, ad them to the product, the totall being deuided by 12. the quotient shewes the number of minutes contained in an vnequall or planetarie houre.

And againe, if at any houre of the day or night you know not what planetarie houre it is, ỳ is to say, how many planets haue ruled since the beginning of the day or night proposed: multiply the number of the houres past from sunne rising by 60. & deuide the product by the number of the minutes contained in an vnequall or planetarie houre, the quotient will shew you how many houres and minuts of the ☽Planets are past from the ☉Sun rising (if it be in the day) or from ☉Sunne setting if it be in the night: which knowne, enter the table following to know what ☽Planet rules the day and houre proposed, loking for the houre desired in that colume which is right vnder the day proposed: those ☽Planets which are gouernours of the said houres in the day time, being placed on that side next the left hand, and the gouernours of the night on the right hand.

Example.

The 17. of May being Sunday at 9. of the clocke in the Morning, I would knowe what Planet rules? First in the following Kalender, I finde that the 17. of May the day is 16. houres long, therefore I multiplye 16. houres by 60. minutes and the product is 960. that deuided by 12. brings in the quotient 80. mi. for ỹ length of a Planetarie houre at that time: then from 4. of the clocke (the time of the Sunnes rising) till 9. a clocke, the houre proposed is 5. houres, which multiplied by 60. brings 300. that deuided by 80. (the length of a planetarie houre,) brings in the quotient 3. houres and 3. quarters: so I conclude, that at 9. of the clocke, 3. Planets haue past their Regiment, and the 4 hath ruled 3. quarters of his houre: therefore vnder the title Sunday, in the top of the Table, I loke for 4. toward the fote of the said table, against which on the left hand is placed Luna, therefore I say that the 17. of May being Sunday, at 9. of the clocke in the morning, Luna shall haue raigned 3. quarters of her houre.

| Gouernours of the day. | Sunday, | Munday. | Twesday, | Wednesday, | Thursday, | Friday, | Saterday. | Gouernours of the night, |
|---|---|---|---|---|---|---|---|---|
| Sol | 1 | 12 | 9 | 0 | 10 | 0 | 11 | Iupi |
| Venus | 2 | 0 | 10 | 0 | 11 | 1 | 12 | Mar. |
| Mercurie | 3 | 0 | 11 | 1 | 12 | 2 | 0 | Sol. |
| Luna. | 4 | 1 | 12 | 2 | 0 | 3 | 0 | Ven. |
| Saturne | 5 | 2 | 0 | 3 | 0 | 4 | 1 | Mer. |
| Iupiter | 6 | 3 | 0 | 4 | 1 | 5 | 2 | Lun. |
| Mars | 7 | 4 | 1 | 5 | 2 | 6 | 3 | Satu. |
| Sol | 8 | 5 | 2 | 6 | 3 | 7 | 4 | Iupi. |
| Venus | 9 | 6 | 3 | 7 | 4 | 8 | 5 | Mar. |
| Mercury | 10 | 7 | 4 | 8 | 5 | 9 | 6 | Sol. |
| Luna | 11 | 8 | 5 | 9 | 6 | 10 | 7 | Ven. |
| Saturne | 12 | 9 | 6 | 10 | 7 | 11 | 8 | Mer. |
| Iupiter | 0 | 10 | 7 | 11 | 8 | 12 | 9 | Lun. |
| Mars | 0 | 11 | 8 | 12 | 9 | 0 | 10 | Satu. |

## *A Rutter, for the Courſes round about Ireland, from* Cape to Cape, and what tides it makes in euery Harbor, and how many leagues it is from Harbor to Harbor.

IN primis, from Cape-cleare to the Miſon-head, is 7. leagues, and lyeth weſt and by north and eaſt and by ſouth, you ſhall finde a Hauen northweſt from Cape-cleare, to Crooke Hauen, and it floweth there eaſt northeaſt, and weſt ſouthweſt, you muſt goe weſt to enter into it.

From the Miſon to the Durzib, is 7. leagues, and lyeth weſt northweſt, and eaſt ſoutheaſt.

Bear Hauen lieth from the Miſon head, north northweſt 3. leagues and one halfe, you muſt goe northweſt into the Hauen, it floweth eaſt northeaſt and weſt ſouthweſt: if you will anchor betweene the Durzib and the maine Land, you muſt goe aborde the Iland, for the eaſt ſide is not found.

The 3. Ilands that be of the point of the Dowrſies, which is called the Bull, the Cow, and the Calfe, they be ſound, you may goe within them or elſe betweene them, for there is no danger but what you ſee.

Dowrzies, and Blaskey lye north and by weſt, and ſouth and by eaſt, and there is betwixt them 12. leagues, the Skellocks is betweene both, and it floweth northeaſt and ſouthweſt.

Northeaſt of the great Scellocks a 3. leagues off you ſhal find the entry of Vallens, you muſt runne eaſt ſoutheaſt to enter in, it floweth eaſt north eaſt, you muſt borrow of the Iland to enter

in, for the point of the easter side is long.

North northeast of the great Scellocks 6. leagues of, you shall finde the Hauen of the Ventry, which is a good road: it floweth east northeast.

N.E. by N. of the great Skellocks 7. leagues you shall finde the hauen of Dinggell, and without the Hauen is a rocke called the Croo, which is sound on both sides: the rocke doth not couer but on a spring tide, you must run northwest and by west into the Hauen, it floweth east northeast and west southwest.

The Ventry and the sound of Begue lyeth south by east and north by west 3. leagues, and when you are past into the sound of Begue, you must lye east and by north into the Rode against a red clift which is on the south side.

Southeast of the sound of Blackskey a 6. leagues of, you shall finde a good harbor named Begue, which is to the northeast of Valence, the said Hauen hath two entryes, but the west side is the best, you must take hede of a suncke rocke which is on the Ilands side, which you must leaue on your Larbord side going in, and it floweth east northeast and west southwest.

You shall vnderstand that the said sound of Blaskey, lyeth southeast and northwest, but you must take hede of a sholde that is on the east side a thwart of the Sezebras.

From Blaskey to Smerrick is 3. leagues, and if you enter into the Hauen, you must goe southwest into it; it floweth east northeast and west southwest.

There is a Hill to the eastward of Smerrick, which is called Sinbrandon, goe from Smerrick northeast by east & you shall go with Lopus-hed, which maketh entry of the Riuer of Lymerrick on the north side, there is from one to the other 10. leagues.

Smerrick and the head of the Kerry, lye east northeast and west southwest 7. leagues a sunder and there is within the baye 3. Ilands called Salline.

From Lawpsted to the Seatryes is 7. lea. they lye east N.E & W.S.W. and if you enter into the riuer, take hed of a shold halfe way betweene Lawpshed and an Iland called Statrick, which

you

you must leaue on the north side, and to the eastward of that Iland, is a good road, it floweth east northeast, and west, Southwest.

From Scatricke to Quoine is fiue leagues, you must goe east, and you shall finde two Ilands, they be flat Ilands: goe you to the northwards hard aboord them, and frō thēce run East north east, and you shal finde a Rocke called the Bieffe, go hard a board the south side of the said rocke called the Bieffe.

And when you are at the said rocke, you must rowe Southeast, and you shall finde another Rocke called the small Bieffe, then goe with the Iland of the entrie of Dorsey and borrow aboard the Iland as nære as you can for feare of the banke, going into the Hauen, and you must more at the Castle by foure Cables, for there goeth a great tide, it floweth East northeast, and west southwest.

The Sownd of Blaskey, and the Ilands of Arrin, lyeth north northeast, and south southwest, and there is betwæne them. 16. leagues: the Ilands lye east and west, and makes the entrance of Galloway, and of the other Ilāds: there is one which is naught, but the west sound is good, and the next sound to it is good, which is called the little sound, but the sound comming from the east is naught, but the nert comming to the Black shore from the east, is partly good, but you must put the two partitions to the Iland, for it is dangerous: you must vnderstand that there is one Iland in the course way, betwirt Lampshed and the entrie of Galloway, that hath a great Rainie, a league and halfe of the maine land.

If you goe before the Towne of Galloway, goe aboard the Black-shore, and bring the Black-shore southeast of you: then goe northeast, and you shall fetch an Iland called Motton Iland and there is betwæne them both thræ leagues, you must not trust to the North shore, for there is a sholde halfe way to the Black-shore, and the Iland of Motton is thwart of two white points, which is on the North side.

The saide sholde is vpon the west southwest side of the saide Iland of Motton a league & halfe of at a spring tide, thē shall you

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And when you are at the said rocke, you must rowe Southeast, and you shall finde another Rocke called the small [illegible]

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[illegible] the Towne of Galloway, goe aboard the Black-shore, and bring the Black-shore southeast of you: then goe northeast, and you shall fetch an Iland called Motton Iland and there is betweene them both three leagues, you must not trust to the North shore, for there is a sholde halfe way to the Black-shore, and the Iland of Motton is thwart of two white points, which is on the North side.

The saide sholde is vpon the west southwest side of the saide Iland of Motton a league & halfe of at a spring tide, thē shall you

ſee it drie, and it floweth at the ſaide Iland, eaſt northeaſt and weſt ſouthweſt.

The ſound of S. Gregorie and the Rode of Galue, lyeth eaſt northeaſt and weſt ſouthweſt, and there is betwixt them 8. leagues.

The ſound of S. Gregory and Siluis head, lye ſoutheaſt and northweſt and the diſtance betwixt them is 9. leagues.

Slinſhed and Black-rock lye ſouth by eaſt and north by weſt, and are diſtant 15. leagues.

Black-rock is an Iland which is weſt of Kill-head, a league of the Cape: the ſaide Black-rock and the Staggs lyeth northeaſt and ſouthweſt, and are diſtant 12. leagues.

From the ſaide Black-rock, runne north and you ſhall finde the Iland of eaſt Euesky, and there is betweene them 2. leagues.

Southeaſt of the Staggs there is a Hauen called Broad hauen: from the Hauen to the Stagge is 4. leagues: the Staggs is a Cape that maketh the entry of the Riuer of Raffen, they lye eaſt and weſt and are diſtant 8. leagues: the Saggs and the Cape of Tellen lye northeaſt and ſouthweſt and are diſtant 15. leagues.

Betwixt the Staggs, and the Cape of Tellen in the Baye is the Hauen of Moye, the Hauen of Portwaye, the Hauen of Slego, the Hauen of Ballecſhennen, the Hauen of Dongall, the Hauen of Kellegego, and the Hauen of Tellen.

The Cape of Tellen, and the Iland of Arron, lye north northeaſt and ſouth ſouthweſt, and are diſtant 7. leagues.

The Iland of Raghlenborne, and Tellen, lye ſouthweſt and northeaſt and are diſtant 2. leagues.

The Iland of Raghlenborne, and the Iland of Torre, lye north northeaſt and ſouth ſouthweſt, and are diſtant 14. leagues.

To the eaſtward of Torre, is a Cape called Horne-head, and are diſtant 2. leagues: ſoutheaſt of Horne-head is a Hauen called Sheep-hauen, it floweth eaſt and weſt, but you ſhall haue in the Baye a good roade for all Windes: the ſaid Hauen is a broade Hauen, and is two leagues from the Cape.

Horne-

Horne-head and the entry of Loughfoile, lye east northeast, and west southwest, and are distant 6. leagues.

The entry of Loughfoyle, and the Iland of Enersterhoulde, lyeth northeast and southwest, and are distant 5. leagues.

The Iland of Torre, and the Iland of Enersterhoulde lyeth east and by north, west and by south, and are distant nine leagues.

The entry of Loughfoyle, and Enesterhould, lye southeast and northwest and are distant 5. leagues.

The Iles of Enersterhould, and Skerris Portrush, lye east southeast and west northwest, and are distant 10. leagues.

You must understand that the riuer of Loughfoyle lyeth from Skerrish portrush, west southwest, and east northeast, and there is betwixt them, the Riuer of the Band: there is betwæne Portrush and Loughfoyle, 5. leagues: There is in the entry of Loughfoyle, a Rocke which is called the Tonnes, which is dangerous for any Shippe of charge, also there is a Channell of the east side of the Tonnes, hard aboarde the shore, but you must haue your tide: it floweth east by south and west by north: Skerris portrush and it, lyeth south and north and are distant 12. leagues.

Skerris portrush, and the Ilands of the Raghlens, lye northeast and by east, & southwest by west, and are distant 5. leagues, it floweth in Skerris east south east, and west northwest, the flood commeth from the eastward.

Off the Raghlens is a Cape called the faire Forland, and betwixt them is a league and a halfe the faire Forland, and the Knee lyeth south southeast, and north northwest, and are distant 9. leagues.

The faire Forland and Loughrian in Scotland, lye east southeast, and west northwest, and are distant 15. leagues.

There is betwixt the Knee and Carickuergus, fiue leagues.

The point of Loughrian, and the Ilands of Commoras in Scotland lie north and south, and you must passe by Ellisо, and by the hauen of Lambacha sunder 17. leagues.

The point of Loughrian and Copnam Iles, lieth northeast, and southwest.

The Knee and the Rocke of the Maidens, lye north east by north.

The Knee and Ellse in Scotland, lye north east by east, distant 10. leagues.

Longhrian in Scotland and the mould of Galue, lyeth South South east, and north north west, and are distant 7. leagues.

The Mould of Galue, and the Calfe of Man, lie south south east and north north west, and are distant ten leagues.

The Copman Iles, and the roade of Carricke Vergus, lye east and west, and are distant 4. leagues, it floweth in the sownd east south east, and west north west.

Copman Iles and the point of the Moullens, lye south south east, and north north west, and are distant 7. leagues.

The point of the Moulens and the Ile of Lambay, lyeth south south west, and north north east, and are distant 21. leagues.

Lambay and Carlingford, lie north north west, and south south east, and are distant 1 . leagues.

Lambay and the Ile of Dalke, lye south south west, and north northeast, and are distant 5. leagues.

The banke of Wiclo beginneth thwart of the forth of Dubling and containe to the Ile of Tosker, they lye north by west, and south by east, and they lie in length 24. leagues.

Tosker, and the point of the Grenord, lye east by north, and west by south, distant 2. leagues.

And when you are bound to the eastward of the Grenord, you must keepe the Mountaine of Washford, aboue the low land, and so you shall goe cleare of all the dangers betwixt you and the shore: and if you close the Mount with the low land, then you shall goe with the dangers.

Tosker and the cape of Canwall, lye south by east, and north by west, 40. leagues.

Tosker

Tosker and the Salts, lie east northeast, and west southwest, distant 6. leagues.

The Salts and Silly, lye south and north, and are distant 33. leagues.

The Salts and the tower of Waterford, lye east and west, distant 5. leagues.

The tower of Waterford and the Ile of Ballecutin, lye southwest and by west, and northeast by east, but betwæne the tower of Waterford and Ballacutin, is a hauen called Yoghal, and a Sea-bord, it is an Iland called Capell Ile, and betwæne Capell Iland and Bellacutin is 4. leagues.

The tower of Waterford and Heluick-head, lyeth east and west, distant 3. leagues.

Capell Iland, and the Iland of Ballacutin, lie westsouth west, and east northeast, and are distant 3. and a halfe leagues.

Ballacutin and Cork Hauen, lye west by south, and east by north, and are distant 3. and a halfe leagues.

Oyster Hauen and the Oldhead of Kinsale, lye southwest and northeast, distant 2. and a halfe leagues.

The Hauen of Kinsaile lyeth from the Oldhead north northeast, and going in, you must kæpe Bane Castle open of the west land.

The Oldhead and Cape Cleare, lye west by south, and east by north, and are distant 14. leagues.

Cape Cleare and Silly, lye east southeast, and west northwest, distant 50. leagues.

There lyeth from Fasten a hauen called Crock hauen, and is from it northwest, distant 4. leagues.

There is a Hauen called Scoll Hauen, which lyeth from Fasten, north and by west, distant 5. leagues.

There is a head-land halfe way betwixt the Old-head of Kinsale and Baltemore, which is called Kendonetedo, and it lyeth northwest by west: from it is a good hauen called Clendor, there is a high land to the east ward, you must goe aboard that high land, and so into the hauen. There is a raine of Rockes on the west land, that goeth to the eastwards, therfore kæp the east

side,

ſide and when you come in, Anchor before the Caſtle: there lyeth weſt northweſt from the ſaid head, a good Hauen, called Caſtle-hauen, 4. leagues from it, and if you come out into the Sea, and meete with the Staggs, you muſt goe northeaſt into Caſtle-hauen, and in the entry there is an Iland which you muſt leaue on the eaſt ſide of you, and another flat Iland which you muſt leaue on the weſt ſide of you: you may goe dry at low water from it to the maine, for it is very nigh to the weſt land, but be bould on the eaſter Iland, and goe right with a chappell that lyeth on the eaſt ſide of the maine Land, and when you are thwart of the Chappell, you ſhall ſee a Caſtle on the weſt ſide, and thwart of the Caſtle you may enter in 12. fadam, it is from the Staggs 3. and a halfe leagues.

You muſt vnderſtand that the flood ſhoots from Dorze to the Old head of Kinſale north northeaſt, and the ebbe to the contrarie, and from the Old head to the Towre of Waterforde, northeaſt and ſouthweſt, and from the Dourze to the northwards, north northeaſt and ſouth ſouthweſt.

If you will goe in betwixt the Caſh and the Northhead of the grounds into Dalky, you muſt bring a round hill that ſtands like a ſuger loafe north northweſt, and then you ſhall haue 10. fatham: it floweth ſoutheaſt alongſt the Chaunell and the barre of Poulbacke, there is 8. foote water vpon it at low water, and 3. fatham at full Sea: your barre lyeth ſouth and North, and you ſhal haue in the road of Poulback, 14. foote at low water. To ſaile from Dalkie to the barre of Poulbacke, you muſt keepe a ſmall rocke open, a hand ſpick length, and when you come to the barre, you muſt lie weſt ſouthweſt vp into the road within the Beacon, then muſt you anchor in 4. fatham at high water, for there be 2. Hills, on the ſouth ſide a high Hill, and a low round Hill, bring them both in one, and you bee in the beſt of the Rode. A South ſoutheaſt Moone, makes full Sea.

A note

# A Note for going into Dublin.

If you come for Milford, you muſt leaue all the Ilands to the weſtwards, and when you haue the Graſſam north northweſt, then the Hauen beareth northeaſt by north, and when you come into Dall rode, you may ride in 3. fatham and a half at low water: it floweth eaſt by north.

Milford goeth in cloſe vnder Cowein and Scabon, to the eaſtward, and when you come open of Milford, you ſhall ſee an Iland like the Mawſtone, which lieth on the eaſt ſide, and in Dall rode you may ride for all windes, the Small lieth from the Graſſham 3. leagues, and betwixt them lyeth a ledge of rockes, which is dry at low water, it lyeth midway, it is very dangerous comming betweene them.

A Coaſt

## A Generall and Compendious tide Table, shewing what Moone makes full Sea or high water in al these places following.

*Full Sea on the Coastes of Iutland, Friezland, Holland, Zeland, and Norway.*

AT the Iutlandish Iles before the Riuers of Heuer, Fyder, and Elue. S. and N.

At Enchuisen. S. and N.

The Ile of Vrk before Delfe Ile, at Emden and all the shores of Flanders. S. and N.

Before the Maers deepe. E. and W.

At Hambrow and Antwerp. E. and W.

Underneth Holiland, W.S.W.

At Egmount and Harlem. W.S.W.

In the Bresond and Vourd. W.S.W.

Before the eastern and western entrances of the Emes, or riuer of Emden, before all the coast of Friesland and the Flye. S E.

Before the Ghest of Texell E.S.E

Upon the flats of west Friesland, Wyering, and Amsterdam. S.W.

Without the bankes of Flanders. S.W.

Dodrecht and Zierick Sea. S.W.

Roterdam, and from Harlem to the Riuer of Maes. S.W.

At Ward-house. E. and W.

At Brihac. E.S.E.

Cape Gallant. S. by E.

The Hauens of Yotland and Norway. S. and N.

At Corpus Christi point. S.S.W.

Before the Fen in the Chānell, At Horne, Edam, Ile of Gore,

Before the Maes, before Canfer and Teruer. S.S.W.

Before the Willing and all the Coast of Zeland. S.S.W.

North-cape and Blangbrow. S.W.

Foxnose and S. Nicholas Rode. W.S.W.

*Full*

Ful Sea on the Coast of Frãce, Spaine, and Portugall.

AT Blackneſſe, Armuy, Rammekins and Camfer. s.s.w

Within the Foſſe of Cane. s.s.E

Callice Roade & Deepe. s.s.E

at Boleine, Callice, Grauelin, & Dũkerk, halfe tide, s. and N

The Iland of Baſſe. s.E

Within the Seine, before the Caſquets, before Garnſey. s.E

Before Cherbotough and the Raſe of Blanquert. s. & N

At Newport halfe tide. s. & N

At Seinehead. s.s.w

At Garnſey, and before Saint Poule. w.b.s

Belliſſe and Holy Ile. s.w.b.s

Without Vſhant, and before Burdeaux. E. and w

Brittaine, Penmark, Poiton, and Gaſcoine. s.w

Race of Fountnes. s.w.b.w

Bloy and S. Mathewes. w.s.w

Abrowrath and Saint Maloes. w.by.s

Before the Killiats. s.w

Porthwiſe, & before the riuer of Burdeuax. s.w

From the Race to the Pole-head. s.w

Before the Riuer of Naunts and before the Bay. s.w

In the Bay within Vſhant. w.s.w

At the Sept Iles, and at Callice in the Creeke. w.s.w

Within the Riuer of Roane, & frõ the Pole-head of Burdeaux to the Forland of Fountaines, before Brouage, in the Riuer within all the Hauens aforeſaid it flowes. S.w.by w

At S. Iohn. de luze s.s.E

At Concalo, and Sant Malo, E. & w

At Cape Saint Maries. s.E.b.E

On al the coaſt of Biskay, Galizia, Portugall and Spaine, it flowes ſouthweſt, and northeaſt.

*Scotland.*

IN S. Magnes ſound, s.E.b.E

At Faire Iles. s.E

In the Frith, s.s.E

Faire Ile Rodes. s.b.E

At Orkney, s.E

*England.*

AT Barwick it flowes. s.s w

At the ſtaples halfe tide. N.E. by N

At Howncliffe foot halfe tide. N.E. by E.

At Flam-

At Flambro head one quarter tide E.N.E
At the shw S.& N.
At Tinmoth one quarter tide S.W
At the Sporne W.by S
Newcastle & Humber w.b.s
Winterton E.S.E
Black taile and the Nowre S.by W
Blakney & the shields E.& w
Yarmouth S.E.by E.
Oxford & Albrow s.E.by s
Whitbay and Robin-hoods bay. S.W
Before Hartle poole S.W.
Scarbrow one quarter tide W.S.W.
Hull & Lin half tide E.& W.
Before Hũbers mouth N.W
At Burnham one quarter tide E.& W.
Cornmer S.E.
At Liestow quart. tide S.S.E
Harwich & Douer S.S.E
Harwich within s.b.E
South Forland s.s.E
Before Margate & Thames mouth. s.by E
Ligh & Kentish knock. s.& n.
Spirits & a long the Swine, s.n
Betwæne Tinmouth and Flambro head s.W
Betwæne Flambro head & Bridlington bay s.W.by W
Betwæne Bridlington and Lawrenas W.s.W
Betwæne Lawrenas and Cromer a long the well, half tide E.& w
Betwæne cromer and Yarmoth rode s.E
Betwæne Laisto rode and Orfordnes s.E.by s.
Betwæne Orford and Orwell waues s.s.E
Betwæne the Naze and the Ware head of Colne s. by E
At the west end of the Nore s.by w
Rochester and Maldon s.b.w
At Grauesend s.s.w.
London and the midst of the heads or straights s.w.
At the north forlands. s.s.E
At Beachy s.& N.
Seauen cliffes s.E.
In the Downes. s.s.E
In the Camber and at Goreend s.by E
At Cambernes and at the Needles s.E.by s.
In Cambernes rode s s.E
Porchmouth, Hampton and the Ile of Wight s. and N
In the Offing from the north Forland to ẏ south Forland, it rũneth halfe tide, and from the south Forland to the Nasse, it runneth halfe tide, and halfe quarter tide, and frõ the Nasse to Fairly one halfe tide, and frõ Fayrli

Fayrlie to Beachy one quarter tide vnder other.

At Portland rode E.s.E
At S. Ellens s.E.by E
Within the Race of Portland, at Poole in the Hauen, at Home head, and thwart of Plimouth and Dartmouth s.E.
At Waymouth E.& w
At Famouth, Foy, Fourne, Plimouth & Darmouth w.b.s.
Briſtow & Foulnes. E.b.s.
At the Start E.by s.
Mouſhole w.s.w
S. Dauids head E.& w
Milford hauen E.s.E
Ile of Man and Catnes s.E
3. leagues off the ſhoze, at the Lizard to the ſhoze, and to the Lands end E.s.E
Within Torbaye and in the Bay of Carnaruen w.b.s
At ỹ mouth of Seuern, w.b.s
At the Moonles w.b.s
From the Lizard to the Sorlings. w.by s
Before Silly in the Channell E.& w
At Silly halfe tide s.s.w
Within Mounts baye, and in the ſea of Wales and Seuern w.s.w
At Lundy and the Holmes of Briſtow E.& w
In the Sleeue betweene Silly and Vſhant s.& N

Note that the floud ſettes in at ỹ eaſt end of Wight till a s.E Mone: in the rode at Dungeneſſe ſouth ſoutheaſt, but without in the Chãnel a ſouthweſt Mone full Sea: from the Seames, and in the broad ſound betweene it and Vſhant, the flod runneth eaſt northeaſt, and weſt ſouthweſt.

*Ireland.*

At Caldy w.b.s
Waterford and Abermorick E.& w
At Cape-cleare E.s.E
Macknells Caſtle. S.E.by E
Dublin & Lambay s.e.by E
Dumbar & Kildien s.E
Dungaruin, Kinſale, Corke hauen & Baltemore w.s.w

## *The course of all the Coastes of Holland, Zealand,* France and Spaine, vpon what point, and in what distance they are.

| | |
|---|---|
| From the Ile of Texell vnto Egmont. | S.& by w.leagues 5 |
| From Egmont vnto the Maze. | s.s.w.l.11 |
| From the Maze vnto the Wieling. | s.w.l.12 |
| From the Wieling vnto the head of strait betweene Douer and Calice. | w.s.w.l.18 |
| Frō ỳ Ile of Walkerē or Flushing vnto Calice. | s.w.& b.w.l.22 |
| From blackneſſe vnto Deepe. | s.s.w.l.12 |
| Frō Deepe vnto Seyne head, or the Riuer of Seyne, | w.s.w.l.11 |
| From the Seyne head to the Riuer of Cane. | s.w.l.8 |
| From thence vnto Cape de la Haugue. | N.w.l.12 |
| From thence vnto the Caskets. | w.& by N.l.8 |
| From the Caskets to Garneſey. | s.w.& by w.l.4 |
| From Granſey to S. Malo. | s.s.E.l.10 |
| From Granſey to the ſept Iles. | s.w.& by s.l.12 |
| From the ſeauen Iles to S. Poul. | w.s.w.l.8 |
| From thence to the Fourne, | w.s.w.l.10 |
| From the Caskets to the Fourne. | s.w.& by w.l.34 |
| From the Fourne to S. Mathewes point. | s.s.E.l.3 |
| From thence to Fontenau or Fonteynes. | s.& by E.l.5 |
| From Vſhant to the ſeams, Seabord if. | s.l.7 |
| From Fontenau to the weſt Penmarques. | s.E.l.7 |
| From thence vnto the Ile of Croy. | E.& by s.l.12 |
| From the weſt Penmarques, to Bel Ile. | E.s.E.l.15 |
| From thence to Heys somewhat more eaſterlye. | s.E.l.12 |
| From thence againe vntill within Piquelier | E.& s.l.10 |
| From thence againe vnto Croyſill. | E.& by s.l.9 |
| From Piquelior vnto Heys | s.& by w.l.5 |
| From Heys to the Kiliats. | E.s.E.l.10 |
| From the Ile of Heys to Porthuis. | s.E.& by E.l.12 |

From

| | |
|---|---|
| from S. Martins Iland to the burning Ile | s.E. & by E.l.3, |
| from the burning Ile to the Oyster banke. | s.s.e.l.3, |
| from S. Martins Ile to the Towre of Cordam | s. & by e.l.12. |
| from thence vnto Bayone | S. & N.l.28 |
| from Bayone to Orio. | W.S.W.l.5 |
| from Orio vnto S. Jon de Luz | E.S.E.l.6 |
| from Orio vnto S. Andrew | W. & by S.l.20 |
| from S. Andrew to Cape de Pennas | E. & W.l.30 |
| from Cape de Pennas to Ribadeo | S.W. & by W.l.12 |
| from Cape de Pannas to Ortegal | W. & by W.l.20 |
| from Ortegal vnto Ribadeo | S.E.l.14 |
| from Ortegal vnto the Ile of Cizaega | S.W. & by w.l.12 |
| from Cizaega vnto Coronna | E.S.E.l.6 |
| from thence vnto Cape de Coriana | W.S.W.l.10 |
| From Coriana to Cape Finisterre | S. & N.l.3 |
| From Finisterre vnto Bayone | S.E. & by S.l.14 |
| From Bayone vnto Port de Port | S.S.E.l.18 |
| From Port de Port to Aueiro | S. & N.l.8 |
| From Aueiro to Montega | S.S.W.l.5 |
| From Montega vnto Barlinges | S.W.l.12 |
| From Barlinges vnto Roxende | S. & by E.l.12 |
| From Roxende to S. Vues point | S.E. & by S.l.8 |
| From thente vnto Cape S. Vincent | S. & N.l.24 |
| From thence vnto Pharo | E & W.l.14 |
| From Pharo vnto Lepe | N.E. & by E.l.12 |
| From Pharo to Saltees | E.N.E.l.18 |
| From Saltees to Chipiona | S.B.l.8 |
| From Chipiona to Calis Malis | S.B.l.6 |
| From Calis vnto the straight of Gibraltar | S.B.l.8 |
| From Calis vnto Cape de Cantin | S.W. by S.l.60 |
| From Cape de Cantin to the Ile of Madera. | W.l.104 |
| From Cape S. Vincent to Madera | S.W. & by w.l.115 |
| From Roxende to Madero | S.W.l.130 |
| From Roxende to the Ile of Tercera | W.l.210 |

## *The Courses of England, Ireland, and Scotland.*

From Boecknes vnto Leeth in Scotland s.s w.l.28
From Leeth vnto Barwicke s.s.E.l.8
From Barwicke vnto the Holy Ile E.s.E.l.4
Frō S. Abbes head to the eastterne ende of Farne Iles s.E.l.6
From the Iles of Farne to the Tees mouth s.s.E.l.16
From the riuer of Tees to Flamboroughhead s.E. & by E.l.14
From Flamborough head to Blackney s.E.l.18
From Blackney vnto Winterton s.E.l.8
From Winterton vnto Lestoff s.& by E.l.8
From Lestoff vnto Orford Hauen s.l.7
From Orford vnto the Foreland s.s.E.l.13
from the Foreland to Douer s.l.5
from Douer to the Shingles, or the Nesse point s.w.& b.w,l.7
from the Nesse point vnto the Beache w:s:w:l:6
from the Beache to the Ile of Wight w:& by s:l:15
from Wight vnto Portland w,& by s:l,10
from Portland to the Start point w:s,w:l:14
from the Start vnto Ramhead point w:n:w:l:6
from Ramhead vnto Dodmans point w:s:w:l:8
from Dodmans to the Lizart point s,w:& by w,l:6
from the Lezard to the Iles of Sillye w:l:12
from the Lizard to the Lands end w:n,w:l.8
from the Lands-end to the Ile of Lundy n,e,l:14
from thence vnto the Holmes of Bristol n:e,& by e,l:16
from thence vnto the Ile of Caldie w:s:w,l:25
from thence to the Iles of Salteys, on the Coasts of Ireland, west n:w:l:20
from Salteys to Cape Cleere w:s:w:l:25
from Cape Cleere to the Ile of Dorsey w:l:12
from the point of Dorsay to the Ile Blakem n:n:w:l,16
from Blakem vnto the Iles of Arren n,n,e,l:14
from the Iles of Arran to Galwicke, or the Galfe in Ireland, east n.e.l:6

Of

*Of diuers and ſundrie Courſes ouer the weſterne Sea.*

FRom the Texel on the Coaſtes of Holland, to Flamborouth w:n:w:l:45
from Texel vnto Winterton in Norfolke w:l:32
from the Ile of Texel vnto Leſtoffe w:& by s:l:28
from the Riuer of the Maze, in ſouth Holland vnto Harwich w:l:26
from the ſaid Maze to the Forland of England w:& by s:l:25
from the Marſdeepe in S.Holland, to ỳ ſaid Foreland, s:w:l:36
from the ſaid Marſdeepe to Calico w:& by s:l:38
from Douer vnto Bolloyne s:e:l:8
from Bolloyne vnto the Beache w:l:16
from the Beache to Deepe in Normandy s.e:l:18
from Deepe vnto the Ile of Wight e:s:e:l:28
from Wight to the Seyne head or mouth s:e:l:20
from the ſaid Riuer of Seyne to Portland w.n,w:l:30
from the Ile of Wight vnto the Caskets s.w:& by s:l:14
from Garnſey vnto S.Malo in Normandy s:s,e:l:8
from the Caskets to Portland n,& by w:l.10
from the Caskets to the Start point w,n,w,l,16
from the Start to the Septs Iles in Normandy s:s:e:l,24
from the Start to S.Poul in Normandy s,& by w,l,22
from S.Poul to Portland n,e,& by n,l,32
from the Fornes to Ramhead n,n,e,l,28
from the Start point vnto Vſhant s,w,& by s,l,32
from the Fourne to the Lizard s:& n:l:22
from Vſhant to the Iles of Sillye n,n,w,l,26
from the Sorlings to Milford Hauen n,& by e.l,25
from the Sorlings to Wexford in Ireland n,n,w,l,34
from the Sorlings to Cape Cleere n,w,l,42
from Cape Cleere to Cape de Finiſterre s:& n,l,130
from the Lizard to Cape de Finiſterre in Galicia s,s,w,l,112
from Vſhant vnto the Ile of Cizarga in Galizia s,s,w,l,85
from Vſhant to Laredo in Biſcay s,s,e,l,85

from the Scames rockes to S. Sebastian in Biscay South East & by S.l.10

from Vshant againe to cape de Pannas in Biscay South and N.l.70

from Bel Ile vnto Ortegal in Galicea S.W.l.75

from S.Martins Ile to Ortegal w.s.w.l.85

from Ortegal to cape de Coriana s.w.& by w.l.24

from cape de Finisterre to the Iles of S.Michael w.s.w.l.185

from S.Michael to the Ile of Tercera N.W.l.26

from cape de Finisterre to the Ile of Medera, Southwest & by w.l.190

from Medera vnto the great Ile Canarie s.E.by E.l.60

from cape de Finisterre to Bayone in Galicia s.E & by E.l.15

from cape de Finisterre to the Ile Barlinges s.& N.l.50

from the Barlinges in Portugal to the Ile Canarie s.s.w.l.170

from the Ile of Madera to Calis Malis E.N.E.l.150

from Calis to cape de Cantin s.w.& by s.l. 5

from cape de S.Vincent to cape de Cantin s.& N.l.62

From cape de Vincent vnto the Ile of Madera, Southwest and by west, leagues 120

From Roxen in Portugal vnto the Ile of Tercera, E.& w.l.210

*The Courses of Norway, Swedeland, and East-finland.*

FRom Schuytenes to the Vesteen. S.& by E.l.4

From Vesteen or Wostone to the Iedder s.s.E.l.4

From the Iedder to the Vorsteen or Forstone s.E.l.5

From the Forstone to the Noes E.S.E.l.6

From the Noes vnto Reperwicke, E.N.E.l.8

From Reperwicke to Mardon N.E.l.10

From Mardon vnto Iofferland N.E.l.8

From Iofferland to Langhesondt N.N.E.l.1

From Langhesondt to Ferderoer N.E.& by E.l.6

From Ferderoer vnto Soen water N.l.6

From Ferderoer vnto Roeghe N.N.E.l.4

From Ferderoer vnto Akersond E.N.E.l.6

From Akersond to Maesterland s.E.& by E.l.4

From Pater-

From Paternoſter to Nydrinke. S.E.l.8
From ny drinke to Waerberghe. S.E.& by E.l.4
From Waerberghe to Swedoroer S.S:E:l,6
From Swedoroer vnto Col. S:s,w:l,3
From Col vnto Lappeſand. s.E:l,3
From Lappeſand vnto Ween. s.s.E.l,2
From Ween vnto Drakerriff. s.& by E:l,7
From Drakerriff to Steden. s.& by w:l,4
From Steden vnto the noꝛth ende of Bornholme. Eaſt and by north, leagues 15
From Bornholme vnto Anno. N.& by W:l,8
From Anno vnto the Rocks. N:E:l,8
From the Rocks vntill within the Calmerſond. North North-Eaſt leagues 10
From Calmerſond to the Sweediſh Ionckfrow. N.N:E:l,8
From Ionckfrow to Landfoort. N,N,E,l,8
From thence vntill beſoꝛe Duryhauen. N:E:& by E:l,8
From the Stockhoms Schares to view of Abo. N:E:& b.N:l,24
from View vnto Luns Vtſcares, E:N,E:l,28
from the Vtſchares to the Ile Putfuagto. E:& by N:l,30
from thence vnto Somere. E,& W:l,9
from Somere to the red Hole of Wiburgh. N.E,l,9
from the Red-hole to Traelſand. N.E,& by N,l,2
from thence vnto Wiburghe. l.2

*Diuers Courſes vpon the whole Eaſterne Sea.*

From Borniff to Bouen Berghe. N:N:E:l,45
from Bouernberghe to the Noes. N:N:W:l:24
from the Noes vnto the Eemes. s.& by E:l,58
from the Noes to Bortniffe. S:& N:l,75
from the Noes vnto the Ile of Walkeren in Zealand S.& by W:l 92
from the Noes to the Holmes beſoꝛe Yarmouth. s,s,w,l,80
from the Noes vnto Tinemouth. s:w:& by w:l,78
from the Noes vnto Bocknes. w:l,68
from the Noes vnto the Holmes, s,E:l,17
from the Noes vnto Sckaghen. E,& W:l.25
from Sckaghen vnto Mardou. N,W,l,16

From Sckaghen to Langsond N.N.W.l.16
From Sckaghen to the Ferdet N.& by W.l.15
From Sckaghen to Maesterland E.N.E.l.10
From Sckaghen to the Trindell S.E.& by E.l.7
From the Trindell of Lesou vnto Anout S.E.l.8
From Anout to Col s.s.E.l.9
From Col to Aselyn on Zealand in Denmarke s.w.& by w.l.8
From Aselyn to Steuens head W.N.W.l.14
From Falsterbonet riffe to Witmont s.E.& by s,l.14
From Steden to Bornholme E.& by s,l.16
from Bornholme to Reefcol E.& by N.l.20
from Bornholme to Coolsberghe s,E,l.10
from Bornholme vnto the Rocke N,N,E.l,15
from Bornholme to Houbrough N,E.l,38
from Houbrough to Rigs head s,& N,l,28
from Houbrough to the Windou E.N.E.l.26
from Ostergarde vnto the Windou E,& W,l,20
from the Windou to Dageroot N.E.& by N.l.28
from Dageroort vnto the Gotscheſand N,E,& by N,l,8
from Dageroort vno Vieu N,W,& by N.l.10
from Gotscheſand to Bouschaer N,& by E,l,15
from Marien vnto Elsenuos N,N,E,l,14

*The Courses of Frisland, Iutland, Pomeren, Courland and Liffland.*

FRom Mares deepth in Holland to Borniffe N.E.l.10
from Borniffe to Wrangherooch E.N.E.l.26
from Wrangherooch to Holyland N.l.5
from Holyland to the Riuer of Elue s.E.& by E.l.6
from Holyland vnto the Riuer of Eyder E.& by N.l.6
from Holyland vnto Rypen N.E.& by N.l.12
from Rypen vnto Bouenbergh N.N.W.l.25
from Bouenbergh to Holmen N.N.E.l.6
from Holmen vnto Robbenknuyt N.E.l.8
from Robbenknuyr to Sckaghen, N.N.E.l.9
from Sckaghen vnto Zebay s,& by W,l,6

from

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| from Zebay vnto Hals | s.& by w,l,5 |
| from Hals vnto Steuens-head | s:s:E:l:5 |
| from Steuens-head to the great Helme | s:s:w:l:6 |
| from the great Helme vnto Wero | s:s:E:l:35 |
| from Wero vnto Bolsacke | s:s:w:l:3 |
| from Bolsacke to Sproo | s:s:E:l:8 |
| from Sproo vnto Longh-land | s:E:l:3 |
| from Longh-land vnto Lalants haeck oz hooke | s:& N:l:7 |
| from thence vnto Femeren | s:E:l:4 |
| from the Ile of Femeren to the Rae of Lubeck | s:s:w:l:8 |
| from Rae to Cruycer-oort | N:E:& s:w:l:4 |
| from Cruycer-oort vnto Robbennes | N:E:& by E:l:12 |
| from Robbennes to Witmont | N:E:& by E:l:8 |
| from Witmont to Iasmont | s:E:& by E:l:2 |
| from Iasmont to the Paert | s:s:E:l:2 |
| from Paert vnto Colsberghe | E:N:E:l:12 |
| from Colsberghe vnto Garshooft oz head | N:E:& by N:l:10 |
| from Garshead vnto Reefcol | E:N:E:l:4 |
| from Reefcol vnto the Risschehooft oz head | E:N:E:l:12 |
| from Rishehead vnto Heel | s:E:l:6 |
| from Heel vnto the Wissel of Danzicke | s:& by w:l:4 |
| from thence to Coninexberghe deepth | N:E:& by E:l:10 |
| from thence to the Mamel | N:N:E:l:12 |
| from the Mamel to Zeuenberghe | N:N:w:l:8 |
| from Zeuenberow vnto the Windou | N:& by E:l:14 |
| from the Windou vnto Lyserœrt | N:& by E:l:8 |
| from Lyserœrt to Domsnes | E:N:E:l:2 |
| from Domsnes vnto Runen | E:& w:l:6 |
| from Runen vnto Rygh | s:E:l:18 |
| from Rygh vnto Pernouth. | N:& by E:l:14 |
| from Pernouth vnto the east end of the Osel | w:N:w:l:10 |
| from thence vnto the Swalaweroort | N:E:l:14 |
| from thence vnto Dagheroort | N:N:w:l,18 |
| from thence vnto Zibourghsnes | N,E,l,6 |
| from Zibourghsnes to Oitkens Holm | N,E,& by E,l,5 |
| from Oitkins Holm to Narien | E,N,E,l:6 |

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| from Narien vnto Wrangher. | E:l,6 |
| from Wrangher vnto eke-holme. | E:& by s,l,7 |
| from eke-holme vnto the Narue. | E:& by s,l,12 |
| from the Narue vnto the Russe-haecke. | N:l,4 |
| from the Russche-hookes to Wibrough, | N.E,& by N,l,16 |
| from the High Iland vnto the Narue. | s,E:l,10 |
| from Highland vnto Somere, | N:E:& by E:l,10 |
| from Highland vnto Narien. | w:s,w,l:20 |
| from Narien to Luz by the Schaeres. | N:N:W:l,8 |
| from Nieu vnto Bouschaer, | s,w:& by s,l,12 |
| from Bouschaer vnto the great Carel. | s,s,w,l,10 |
| from thence to the South end of Godtlandt. | s.E:& by s,l,6 |
| from Houbergh vnto the Ryghs head | s,& by E,l,26 |
| from Houbergh to the south end of Oelandt. | s,w,by w,l,18 |
| from Oelandt vnto Bornholme, | s:w:& by s:l,20 |
| from Oelandt to the Rygish-head. | s:E:l,22 |
| from Bornholme to Witmondt. | s:w:l,9 |
| from Dorenbosch vnto Moen. | N:W:l,7 |
| from Moen vnto Gheester riffe, | s:s:w:l:6 |
| from Gheester riffe vnto Lubecke, | s,w:& by w:l,14 |

*The Sea Courses on the Back-side of Moscouie, and generally of all our Trafficks.*

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| From Candalex vnto Ombay, | s,E,& by E,l,10 |
| from Ombay vnto Stalsland | s.E.l.8 |
| from Stalsland vnto Warsiga. | E.s.E.l.12 |
| from Warsiga vnto Caroa. | E.s.E.l.8 |
| from Caroa vnto Karswick. | e.l.5 |
| from Karswick vnto Pologni, | e.N.e.l.6 |
| from Pologni vnto Sautsnawitz, | N.E:by E:l,6 |
| from Sautsnawitz vnto the Iles. | N.N.E.l.10 |
| from the three Iles to Orlogonos | N.N.W.l.4 |
| from Orlogonos to Sweetonos | N.W.& by N.l.12 |
| from Sweetonos to the seuen Iles | s.E.l.18 |
| from the seuen Iles vnto Kildin | s.l.24 |

from

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| From Kildin to Lauwes | N.W.& by N.l.8 |
| From Lauwes to Ooſter Hauen | s.E.l.10 |
| From Ooſter-Hauen to Waerhuys | N.W.& by N.l.10 |
| from Waerhuys to Matcroff | N.W.l.10 |
| from Matcroff to northkin | W.N.W.l.12 |
| from Northkin to the North Cape | E.& W.l.10 |
| from the North Cape or Loppe to Trompſont | W.S.W.l.40 |
| from Trompſont to Loffoote | S.W.l.38 |
| from Loffoote to Ruſt | S.S.W.l.25 |
| from Ruſt to Stad | S.W. moze S.l.90 |
| from Stad to Berghen | S.& N.l.30 |
| from Berghen vnto Wtſiers | S.& by E.l.30 |
| from Wtſiers to the Noes | S.E.l.29 |
| from Schaghen to the Riffe | S.W.& by W.l.24 |
| From the Riffe to Calice by Flaunders | S.S.W.l.95 |
| From the Heads to the Shingles or Neſſe point, | s.w.& by w.l.9 |
| From the Neſſe point to Beachy | w.s.w.l.7 |
| From Beachy to the Ile of Wight | w.& by s.l.15 |
| From Wight to the Start point | w.& by s.l.26 |
| From the Start to without Vſhant | s.w.& by w.l.30 |
| From Vſhant to Cizarga | s.s.w.l.86 |
| From Cizarga to Cape de Finiſterre | w.s.w.l.12 |
| From Cape de Finiſterre to the Burlings | s.&.n.l.50 |
| From Cape de Finiſterre to the Tercera | w:& by s:l,120 |
| From Cape de Finiſterre to the Ile Madera | s.w.& by s.l.180 |
| From Medera to the great Canarie | s.& by E.l.60 |
| From Forteuentura to Palma | w:l:60 |
| From Porto ſanto to Medera | s.w.l.10 |
| From Porto ſanto to Cape S. Vincent | n.e.& by e.l.104 |
| From Cape S. Vincent to Lanes | E.& by N.l.5 |
| From Lanes to Pharo | E.& by S.l.20 |
| from Pharo or Cape de Maria to Auila | N.E.l.4 |
| from Pharo to Leep | N.E.& by E.l.13 |
| ſrom Pharo vnto Saltees | E.N E.l.18 |
| from Cape de Maria to Rodun | E.& by N.l.22 |
| from Cape de Maria to Chipiona | E.l.23 |

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| from Cape de Maria to Calis Malis | E:& by s:l:28 |
| from Cape de Maria to the Straict | S.E.& by E.l.36 |
| The Straict of Gibraltar hath his course through | E.& by N.l.5 |
| from the Straict of Gibraltar to Malaga | N.E.l.28 |
| from Malaga to Almeria | E.l.28 |
| from Almeria to Cape de Gates | E.& by S.l.5 |
| from Cape de Gates to new Cartagena | N.E.l.28 |
| from Cape de Palo to Cape de Martin | N.N.E.l.32 |
| from Cape de Martin to Valentia | N,N,W,l,10 |
| from Valentia vnto Tortosa | N,E,l,18 |
| from Valentia to Cape de Calo | N,E,l,9 |
| from Cape de Calo to Barzelona. | N,E,& by E:l,16 |

## *The Depthes and Soundings, neere diuers Prouinces. And first of Gascoigne, Poictou, and Britaine.*

VVIthout the Riuer of Bourdeaux, there is 14. fatham depth, but when you come within the sight of Cordam Towre, 30. fatham.

Ouer against the Coast of Poictou, 16. leagues, without Oleron, you haue 25. fatham, but cõming nære the Land 8. leagues from the shore, you haue 35. fatham: In the Channell betwæne Porthuys and Heys, it is 30. fatham, and as much in the Channell of Heys: as also betwæne Heys and Belile, without the Channell is 35. fatham, but within 25. Without Heys, two Rennings off, there is found 45. fatham.

Twentie two leagues Southward of Belile, is 70. fatham, but 9. leagues from the Northwest point of that Iland, towards the Southwest is 60. fatham: and ouer against the most of Belile, in 40. fatham depth you shal sœ land. In your course betwæne Belile and the Seames, you may come no neerer then 50. or 45. fatham, if you sayle from Belile west and by North: When you are against Gloyland, you shall finde 60. fatham depth, without,

out, and within the Rocke which standes off Gloyland to the Seawards, you haue 40. fathō water, in 65. fatham depth, without the west Penmarkes you may saile northwest by west without the Seames, but by night come no nærer then in 55. fathō, for the ground is grose & red sand full of round flints: halfe a league West southwest of the Seames is a ledge of rocks, where you haue 7. fatham depth, but betwæne the Seames and the Rocke is 50. fatham.

In the Channell betwæne the Seames and Vshant is 55. fathō depth, the ground is grose and red sand, with little round stones red and blacke: Nære to Vshant is 45. fatham, but within it is of a variable depth: southwest almost 6. leag. of Vshant, you haue 70. fatham, and the ground is fine white sand, with little white shelles, and other small things like nædles, and then is Vshant East from you, but if the sand be grose and white, mingled with great and white shelles, then it is South east to you, but if you doubt of these grounds, goe Northerly, if your sound be dæper, then are you towards the Seames, but if not so dæpe, then are you in the Channell almost North of Vshant.

Betwæne Vshant and Obeuracke in the trade it is 60. fathō depth: betwæne Vshant and the Sorlings in the midst of the chānell there is 70. fatham: betwæne the Seames and Vshant in 70. fathō water, the ground is of little blacke stones easie to be broken and of yellow earth or clay, but if you find red and hard sand, goe northward till you happen on white sand mingled with long streaks, and then you are in the Channel.

If from Cizarga you saile north north East in the Spanish Seas towards Vshant, and finde your selfe in 80. fathō, you are 14. or 15. leagues of Vshant, but comming nearer, you shall haue 70. fatham water and be 10. leag. from Vshant, but if you finde the ground to be yellow shels and little blacke stones, then are you toward the Seames, therfore you must with the tide beare off northward to shun Vshant vntill you finde white sand, & things like nædles, for such are the grounds of the Channell.

Betwæne Vshant and the Ile of Base when you sayle at foure fatham water, you are 4. leagues off the shoare, but by night

come no nére then 25. fatham: when you are two leagues off Obeurack, you shal finde 25. fatham depth, but 8. leagues off the Sept Ilands you haue 55. fatham.

A League without the rockes of Obeurack, there is a blinde or hidden rocke, so that if you are to sayle vpon aboord betwæne the Fournes, and Obeurack, come no nære the blinde rocke then 40. fatham, but Eastward you may saile in 30. or 25. fatham.

If a ship saying W, S. W, and southwest by West of Silly, at 80. fatham water, be found to be vnder 49. degræs 15. minutes of Altitude, shee is 2[illegible]. leagues from land, and must goe East and by north till shee get 6[illegible]. fatham water, for then shee is in the channell betwæne Silly and Vshant, and then if she be bound for England, shee must sayle more northward, and betwæne the Lands end and the Lizard she shall haue 55. fatham depth.

## *The soundings and groundes betweene Ireland,* England, and Normandy.

THree Leagues without the Iles of Dorsey neere Ireland, it is 45. fatham deepe, in the channell betweene Dorsey and Cape Cleare is 42. or 43. fatham, the channell from Cape Cleare to Saltees hath 45. fatham, but 2: Leagues off Ireland it hath but 40: betweene Saltees and Milford it is 44. fatham deepe, and betweens Lundy and Silly 38: fatham: in the midway betweene Silly and Milford is 44: but north of Silly 40: and 42: and neere England by the Lands ende, the channell is of 50: fatham depth.

Comming from Cape Finisterre sayling N, N, E, if you haue 80. fatham, you are 20 leagues off the shoare, and the ground is small blacke stones with great red sand: in the same course, when you haue but 60: fatham, you are within 12: or 14: leagues of the shoare, but shall not so sone ken land as you thinke for: you shall a great while haue 60: fatham: being at the N: parts of the channell about Silly, betwæne Vshant & Silly, the channell is 70. fath. on the S. side of Silly, the ground is small red stones, and fine

white

white sand: Ouer against the Lizard & Falmouth 4. leag. from shoze is 52. fatham, betwixt Foy and Plimouth sound, in the channell nighest is 60. fatham, betwæne the Lizard & the Starr, beare no nearer the shoare then 35. fath. you may cast anchoz in the trade oz channell in 25. fath. and so shall you lye within the Foreland streame: betwæne Plimouth and the Sept-Iles, in the midst of the Channell is 55. fatham, but 4. leag. S. S. w. off Plimouth is but 35. fath. S. S. E. of the midland of the Start is 45. fath. but from thence 5. oz 6. leag. S. E. is 54. fath. in the channell betwæne the Casketts and Portland is 40. fa. and a lea. N. of the Ile of Aldernay is a hole oz pit 80. fath. dæpe, all the rest of the channell betwæne Portland and Aldernay is of equall depth viz. 40. fat. when you are within kenning of Portland, your sounding is 34. fatham, and 3. leagues off Wight 36. fath. also 2. leagues Eastward of Beachy, betwæne Picardy and Wight the Channel in the midst is 38. fatham, betwæne Winchelsey and Picardy 24. fatham, the shoalds betwæne the heads called the Vrowensand, hath but thzee fatham, and a halfe, but on the south side of it, is 24. fatham: and in all the fayze way betwæne Zealand and Douer, it is 24. fatham dæpe.

## *Depths of the North Sea from* the Foreland.

IN the Channell from Englands Foreland, and sands of Flanders, you haue 24. fathã dæpe: but 3. lea. N. W. by W. of the countrie of Zierrickze called Botbrecke, it hath but 4. fatham, depth: without the shoald the channell of Zealand is 26. fatham N. W. of Harlem, 8. oz 9. miles within the sea, there beginneth a shelfe called de breed Verthien, reaching alongst the Coast of Holland to the plaine of Ameland, where it endeth: ouer against Harlem and Egmond, is 13. 14. oz 15. fatham, & the ground is ful of Mase, mingled with black sand like mustard sæde: the said shelfe hath 15. 16. oz 17. fatham depth: betwæne Texell & Vlieland, where the ground is grosse red sand, 6. oz 7. leagues frõ the

shoare

shoare, for there the shoald is narrower then it is towards the W. end of the channel: without the shoald betwæn Zealand and Texel is 26. fathom deepe, as farre as the shoald which the fishers cal Dogsand. In the channel on England side, ouer against Yarmouth is 35. fathom, but against Flamborough and Scarborough point 38. fath. whereas the white shelfe called Dogsand beginneth, reaching into the north seas to the channell of Helichland: this shoale where it is within kēning of Flamborough point, hath but 9. or 10. fath. but when in the same sand you finde 12. fathom, then Texell is from you southeast, almost 30. leagues, but when you are come to 16. fathom: then are you within 21. leagues, south southeast of Vlyeland.

A Ship that comes from the Riffe, finding 18. fath. depth on the aforesaid sand, is then 20. leagues south and by east of Vlyeland, but at 22. fathom, must then sayle towards the Vlye south and by West, and south southwest: but in if the channell of Helichland, 24. or 26. fathom be found, then must you saile Southwest, and South-west by South, and then you are come to the Schellingh, but if in Helichland sound you haue 27. fathom, then are you altogether to the eastward of it: betwæne the Riffe and the Doggersand, the channell is 26. fathom: without the channell westward, it is 32. fathom deepe.

A ship that comes out of the English Straights, or out of Zealand, hauing at the Riffe 24. fathom, is frō the Naes in Norway 18. leagues north by east, but hauing 20. fathom, is 16. leagues from it north: and finding but 18. fathom, is then 18. leagues off it north by west: the course from thence to the Holmes is 12. leagues north by E. from thence to the point of Scakghens 18: leagues northeast by east, there is a Rocke of one fathom depth, north East, and northeast by East of the Holmes, two Leagues from shoare.

## Depths neere Iutland and Ameland.

IN the Sea without Iutland, a mile from Dodenberg, is a bāk, called Reefe horne, stretching out 8. Leagues west by south, in some

some places but three fatham deepe, and in some places may be sailed ouer, and become a Roade for a North West and a N. wind in 10. fatham: from Ameland towards the sea, the ground is grosse sand, red and black, mingled with shelles: thence southwards in 16. fatham sayling three houres, you shall come to the smoth Sea of Ameland, where the ground is fine sand, with shelles: N. frō Schellingh in 14. fatham, is fine white sand, and in 8. fatham white and blacke sād mingled. Vlyeland hath white sand with shelles, and thin blacke sand in 16. fatham depth, from the west ende of Vlyeland is great & red sānd mingled with blacke like vnto Mustard-seed, about fiue or seauen leagues from shore: at the east end of schellingh to Seawards, at eightene fatham is fine white sand, mingled with blacke, hauing in it things like needles. Ouer against Borcke in the Westerne Ems at 17. or 18. fatham depth, land may be seene: the ground is grose granelly sand; at 14. fatham may Ameland be kend, but Schellingh at 16. and Vlyeland at 15. or 16. fatham water. At the North Hook of Texel, land may be seene at 16. fatham: Holland at 14. or 15. when you saile within the shoald called the Breduerthien, which beginneth northwest of Harlem, and stretcheth alongst the Coast of Holland, to the west end of Vlyeland, and is 7. or 8. leagues from the shoare.

## *Soundings and ground neere the Schaw.*

A Great leag. w. by N. from the Schaw, is 35. fatham depth: N, N, E, a great leag. off the corner of this point is 38. fath. and when the point is northeast from you, then you haue 17. fatham. Betwene this point and Leson, the channell is 20. fath. deepe, and the ground like clay or dirt: betwixt Anhout and Waersbergh, in the midst of the channell is 22. fatham water: betwene Leason and Anhout, the ground is fine and stonie: neere Waersbergh is a shoald of 17. fatham deph: betwene Anhout and Coll is another shoald of 17. fatham, where sometime it is troublesome like a whirle pole.

Depthes

## Depths of the Easterne Seas.

BEtwæne Oeland and Gothland, the soundings are vnequall sometimes of 20. sometimes of 23. fatham, the ground grosse and blacke stonie sand, like Peaſe: when the S. end of Oeland is 2. lea. from you westwards, you haue 27. fatham, where also you may gage water: but when the Chapell in Sudernoordē beareth West N.W. of you, then haue you 31. fatham, and ground fit to gage water: ouer against the Rocke in the faire way is 32. fatham, and a clay ground, but fit for gaging: betwæne the greater and lesser Carta is 14. fatham, vnder which is safe road for ships, there is a shoald betwæne Houberg & Ostergard 24. fath. depth, the ground great red sand, but hardly from thence can you ken Gothland out of the top: there is also to the eastward another shoald of 36. fatham, which when you are past, you haue more then 40. fath. water: when the point of Righ is 3. leagues south E. from you, then haue you 30. fatham: but when it is from you halfe a leag. south S. E. you haue but 15. fatham: the ground is white sand: but when it beareth west a small league from you, then you shall find 16. fatham: ouer against Heel halfe a league from the shoare, it is almost 3. fatham dæpe: the roade for ships at Heel hath 25. fatham depth: betwæn Moan and Falsterborne is 14. fatham depth, betwæn Stead and Falsterborne, in the very Chanell is but 12. fatham dæpe: nære Falsterborne it is full of shoalds, but nære Sted you haue 13. fatham water: betwæne Darkeriff and Southolmen, which is more shoaldy, there is fiue fatham wanting two fote: from thence toward the sound it is sometime dæper, 6. 7, 8. 9, or 10. fatham.

## A note of certaine and most dangerous places in the Sea

THe principall and most perrilous of all, is the Maelstream-well or slorp, called the Mouskstreame; which lyeth on the

backe

backeſide of Norway in 68. degrées on the Northſide of an Ilãd or Rocke called Weeray. This well draweth the water vnto it ſelfe during the whole floud (which is the ſpace of 6. houres & 12. mi.) with ſuch an indraught & force, and with ſuch a noyſe, through the tombling and falling of the waues & ſtreames one vpon the other, that it is rather to wõder at then to write of. So that during that time, within the ſpace of more then 2. leagues round about that rock of Mousk (vnder which that water floweth) no ſhip or other veſſell may come neere, for they ſhould to their vtter deſtruction be drawne into it & ſwallowed vp: but all the time of the ebbe the water is ſo ſtrongly caſt vp againe, that no kinde of ſubſtance or mettell, how heauie ſoeuer it be, can there ſink. So that the Northren Fiſhers at that time doe with their Jollen or fiſhing boates, take many & ſtrange formed fiſhes, which they drawe into their boates with hookes & lines: which they haue ready layde for that purpoſe: for that during the ebbe, they cannot returne into the gulphe nor get vnder the water by any meanes.

The Northrene people that inhabite about thoſe Rockes, doe thinke that that ſtreame palleth away vnderneath a part of Norway vnto the North bottome in East-finland: becauſe in that place there is likewiſe ſuch a Maelſtream (though not altogether ſo ſtrong nor dangerous) where the like fiſhes are taken: and the water is in like ſort troubleſome, as it is vnderneath & about the Rocke of Mousk.

Whereupon many experimented Pilots doe call the ſaid Slorp the Nauell of the Sea, which cauſeth the courſes of the Ebbes & Flouds about al the Lands that are on this north ſide of the Equinoctiall, as the moſt conuenient place for that purpoſe to ſpreade the waters South. North, East and Weſt, that is to ſay, Northerly towards the Pole Articke, South Eaſterly on the backeſide of Ruſſia and Tartarie, towards the ſtraight of the great ſouthſea called Mar del Sur, wherin the ſpiceric Ilands called the Molluccas, neare the Equinoctiall are lying ſouthward toward the North ſea of theſe Low Countries: as alſo on the backſide of Scotland and Ireland, towards the Spaniſh and Atlanticke Seas, and towards the Northweſt beyond Izland to-

## *Depths off the Easterne Seas.*

BEtwæne Oeland and Gothland, the soundings are vnequall sometimes of 20. sometimes of 23. fatham, the ground grosse and blacke stonie sand, like Peaſe: when the S. end of Oeland is 2. lea. from you westwards, you haue 27. fatham, where also you may gage water: but when the Chapell in Sudernoorde beareth West N.w. of you, then haue you 31. fatham, and ground fit to gage water: ouer against the Rocke in the faire way is 32. fatham, and a clay ground, but fit for gaging: betwæne the greater and lesser Carta is 14. fatham, vnder which is safe road for ships, there is a shoald betwæne Houberg & Ostergard 24. fath. depth, the ground great red sand, but hardly from thence can you ken Gothland out of the top: there is also to the eastward another shoald of 36. fatham, which when you are past, you haue more then 40. fath. water: when the point of Righ is 3. leagues south E. from you, then haue you 30. fatham: but when it is from you halfe a leag. south S. E. you haue but 15. fatham: the ground is white sand: but when it beareth west a small league from you, then you shall find 16. fatham: ouer against Heel halfe a league from the shoare, it is almost 3. fatham deepe: the reade for ships at Heel hath 25. fatham depth: betwæn Moan and Falsterborne is 14. fatham depth, betwæn Stead and Falsterborne, in the very Chanell is but 12. fatham deepe: neare Falsterborne it is full of shoalds, but neare Sted you haue 13. fatham water: betwæne Darkeriff and Southolmen, which is more shoaldy, there is fiue fatham wanting two sote: from thence toward the sound it is sometime deeper, 6. 7, 8. 9, or 10. fatham.

## *A note of certaine and most dangerous* places in the Sea

THe principall and most perrilous of all, is the Maelstream-well or slorp, called the Mouskstreame; which lyeth on the backe

backeſide of Norway in 68. degrées on the Northſide of an Iland or Rocke called Weeray. This well draweth the water vnto it ſelfe during the whole floud (which is the ſpace of 6. houres & 12. mi.) with ſuch an indraught & force, and with ſuch a noyſe, through the tombling and falling of the waues & ſtreames one vpon the other, that it is rather to wõder at then to write of. So that during that time, within the ſpace of more then 2. leagues round about that rock of Mousk (vnder which that water floweth) no ſhip or other veſſell may come neere, for they ſhould to their vtter deſtruction be drawne into it & ſwallowed vp: but all the time of the ebbe the water is ſo ſtrongly caſt vp againe, that no kinde of ſubſtance or mettell, how heauie ſoeuer it be, can there ſink. So that the Northren Fiſhers at that time doe with their Jollen or fiſhing boates, take many & ſtrange formed fiſhes, which they drawe into their boates with hookes & lines: which they haue ready layde for that purpoſe: for that during the ebbe, they cannot returne into the gulphe nor get vnder the water by any meanes.

The Northrene people that inhabite about thoſe Rockes, doe thinke that that ſtreame paſſeth away vnderneath a part of Norway vnto the Northbottome in Eaſt-finland: becauſe in that place there is likewiſe ſuch a Maelſtream (though not altogether ſo ſtrong nor dangerous) where the like fiſhes are taken: and the water is in like ſort troubleſome, as it is vnderneath & about the Rocke of Mousk.

Whereupon many experimented Pilots doe call the ſaid Slorp the Nauell of the Sea, which cauſeth the courſes of the Ebbes & Flouds about al the Lands that are on this north ſide of the Equinoctiall, as the moſt conuenient place for that purpoſe to ſpreade the waters South. North, Eaſt and Weſt, that is to ſay, Northerly towards the Pole Articke, South Eaſterly on the backeſide of Ruſſia and Tartarie, towards the ſtraight of the great ſouthſea called Mar del Sur, wherin the ſpiceric Ilands called the Molluccas, neare the Equinoctiall are lying ſouthward toward the North ſea of theſe Low Countries: as alſo on the backſide of Scotland and Ireland, towards the Spaniſh and Atlanticke Seas, and towards the Northweſt beyond Izland to-

## Depths of the Easterne Seas.

FOXED PRINT ON ORIGINAL

I ... are vnequal
... ound grosse
a... f Oeland is
2... re also you
m... dē beareth
W... ound fit to
ga... is 52. fa-
th... he greater
an... for ships,
th... h. depth,
th... you ken
G... the eastward another
shoald of 30. fatham, which when you are past, you haue more then 40. fath. water: when the point of Righ is 3. leagues south E. from you, then haue you 30. fatham: but when it is from you halfe a leag. south S. E. you haue but 15. fatham: the ground is white sand: but when it beareth west a small league from you, then you shall find 16. fatham: ouer against Heel halfe a league from the shoare, it is almost 3. fatham dēepe: the roade for ships at Heel hath 25. fatham depth: betwēen Moan and Falsterborne is 14. fatham depth, betwēen Stead and Falsterborne, in the very Chanell is but 12. fatham dēepe: nēere Falsterborne it is full of shoalds, but nēere Sted you haue 13. fatham water: betwēene Darkeriff and Southolmen, which is more shoaldy, there is fiue fatham wanting two foote: from thence toward the sound it is sometime dēeper, 6. 7, 8. 9, or 10. fatham.

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The Northrene people that inhabite about thoſe Rockes, doe thinke that that ſtreame palleth away vnderneath a part of Norway vnto the North bottome in East-finland: becauſe in that place there is likewiſe ſuch a Maelſtream (though not altogether ſo ſtrong nor dangerous) where the like fiſhes are taken: and the water is in like ſort troubleſome, as it is vnderneath & about the Rocke of Mousk.

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wards Furbushers straicts, where it is thought the way vnto Caray may be found.

There are moreouer to be feared vpon the Westerne Seas verie dangerous streames and gulphs, as is the Race of Portland where oftentimes hapneth such turning and tumbling of waues and streames, that the ships which passe that way are many times in great perill.

Moreouer the race of Blanquert betweene Normandy and the Iles of Alderney roreth and rageth so dangerously, that many ships fall therein headlong, so deepe, that sodainly they are swallowed vp and sunk vnto the very bottom.

The race of Fountney is more dangerous then all these, wherin many small vessells and barks of Brittany and of other countries, are sodainely deboured and cast away: and the entrance of the Garrone, called the Riuer of Burdeaux betweene the towres of Cordam, and the southerne & northerne Asses, is likewise very perrillous, and may ships doe often perish there, if the Pilots be not skilfull and well acquainted with the place.

And these aforesaid being the most full of danger, it behoueth each Pilot or Maister to haue especiall knowledge thereof, and great care to preuent the danger that may ensue vnto them thereby.

## The yeares for which the Tables of the Sunnes place and Declination following, serues.

| First. | Seco. | Third | Leap yeare. |
|---|---|---|---|
| 1613 | 1614 | 1615 | 1616 |
| 1617 | 1618 | 1619 | 1620 |
| 1621 | 1622 | 1623 | 1624 |
| 1625 | 1626 | 1627 | 1628 |
| 1629 | 1630 | 1631 | 1632 |
| 1633 | 1634 | 1635 | 1636 |

Hereafter

Heereafter followeth a most excellent, necessarie and compendeous Kalender, shewing the Prime, Epact, Dominicall letter, Leap yeares, and moouable Feasts, for twentie foure yeares, Inclusiuely comprehending therewith the true day and houre of the Moones Coniunction or change, for 19 yeares to come, with the true place of the Sun, and his Declination from the Equinoctiall, both northwards, and southwards, vppon euery degree thereof, through the 12. monthes of the yeare.

| Our Lord Yeare of | Prime. | Epact. | Sunday Letter. | First Sunday in lent. | Easter day. | Ascent. day, | Whitsũ-day. | Trinity Sunday. |
|---|---|---|---|---|---|---|---|---|
| 1613 | 18 | 18 | C | Febr. 21. | April 4 | May 13 | May 23 | May 30 |
| 1614 | 19 | 29 | B | Mar. 13 | 24 | Iune 2 | Iune 12 | Iune 19 |
| 1615 | 1 | 11 | A | Feb. 26. | 9 | May 18 | May 28 | 4 |
| 1616 | 2 | 22 | GF | 18 | Mar. 31 | 9 | 19 | May 26 |
| 1617 | 3 | 3 | E | Mar. 9 | April 20 | 29 | Iune 8 | Iune 15 |
| 1618 | 4 | 14 | D | Feb. 22. | 5 | 14 | May 24 | May 13 |
| 1619 | 5 | 25 | C | 14 | Mar. 28 | 6 | 16 | 23 |
| 1620 | 6 | 6 | BA | Mar. 5. | Apri. 16 | 25 | Iune 4 | Iune 11 |
| 1621 | 7 | 17 | G | Feb. 18. | 1 | 10 | May 20 | May 27 |
| 1622 | 8 | 28 | F | Mar. 10 | 21 | 30 | Iune 9 | Iune 16 |
| 1623 | 9 | 9 | E | 2 | 13 | 22 | 1 | 8 |
| 1624 | 10 | 20 | DC | Feb. 15 | Mar. 28 | 6 | May 16 | May 23 |
| 1625 | 11 | 1 | B | Mar. 6 | Apri. 17 | 26 | Iune 5 | Iune 12 |
| 1626 | 12 | 12 | A | Feb. 26 | 9 | 18 | May 28 | 4 |
| 1627 | 13 | 23 | G | Mar. 11 | Mar. 15 | 3 | 13 | May 20 |
| 1628 | 14 | 4 | FE | 2 | Apr. 13 | 22 | Iune 1 | Iune 8 |
| 1629 | 15 | 15 | D | Feb. 22 | 5 | 14 | May 24 | May 31 |
| 1630 | 16 | 26 | C | 14 | Mar. 28 | 6 | 16 | 23 |
| 1631 | 17 | 7 | B | 27 | Apr. 10 | 19 | 29 | Iune 5 |
| 1632 | 18 | 18 | AG | 18 | 1 | 10 | 20 | May 27 |
| 1633 | 19 | 29 | F | Mar. 10 | 21 | 30 | Iune 9 | Iune 16 |
| 1634 | 1 | 11 | E | Feb. 23 | 6 | 15 | May 25 | 1 |
| 1635 | 2 | 22 | D | 15 | Mar. 29 | 7 | 17 | May 24 |
| 1636 | 3 | 3 | CB | Mar. 6 | Apr. 16 | 25 | Iune 4 | Iune 11 |

## Ianuarie hath 31. daies.

| The Prime | | | Fast | Leng. of the day. H. M. | ☉ in ♈ Leapeyere D. M. | D. M. | South Declination | ☉ in ♈ First yeare D. M. | D. M. |
|---|---|---|---|---|---|---|---|---|---|
| viii. 6 | 1 | A | New | 7 52 | 1 20 40 | 21 54 | | 1 21 26 | 21 48 |
| | 2 | B | yeres d. | 7 54 | 2 21 41 | 21 45 | | 2 22 27 | 21 38 |
| 2 v. | 3 | C | | 7 58 | 3 22 42 | 21 35 | | 3 23 28 | 21 28 |
| | 4 | D | | 8 0 | 4 23 43 | 21 25 | | 4 24 29 | 21 17 |
| v. 8. | 5 | E | Fast | 8 4 | 5 24 44 | 21 15 | | 5 25 30 | 21 6 |
| | 6 | F | Twelfe | 8 6 | 6 25 45 | 21 4 | | 6 26 31 | 20 55 |
| I. xiii. | 7 | G | day. | 8 9 | 7 26 46 | 20 52 | | 7 27 32 | 20 43 |
| ii. 10. | 8 | A | Lucian. | 8 12 | 8 27 47 | 20 40 | | 8 28 33 | 20 31 |
| x. 17. | 9 | B | | 8 15 | 9 28 49 | 20 28 | | 9 29 35 | 20 18 |
| xviii. 10 | 10 | C | | 8 18 | 10 29 50 | 20 15 | | 10 ♒ 36 | 20 5 |
| | 11 | D | | 8 21 | 11 ♒ 51 | 20 1 | | 11 1 37 | 19 51 |
| vii. 3. | 12 | E | | 8 24 | 12 1 52 | 19 48 | | 12 2 38 | 19 38 |
| | 13 | F | Hillari. | 8 30 | 13 2 53 | 19 34 | | 13 3 39 | 19 23 |
| 2. xv. | 14 | G | | 8 33 | 14 3 54 | 19 20 | | 14 4 40 | 19 9 |
| | 15 | A | | 8 36 | 15 4 55 | 19 5 | | 15 5 41 | 18 54 |
| iiii. 3. | 16 | B | | 8 40 | 16 5 56 | 18 51 | | 16 6 42 | 18 39 |
| xii. 10. | 17 | C | | 8 43 | 17 6 57 | 18 35 | | 17 7 43 | 18 23 |
| | 18 | D | | 8 46 | 18 7 58 | 18 20 | | 18 8 44 | 18 8 |
| 6. i. | 19 | E | | 8 49 | 19 8 59 | 18 4 | | 19 9 45 | 17 51 |
| ix. 4. | 20 | F | Fabian | 8 52 | 20 9 59 | 17 47 | | 20 10 45 | 17 35 |
| | 21 | G | Agnes | 8 55 | 21 11 0 | 17 31 | | 21 11 46 | 17 19 |
| xvii. | 22 | A | Vincēt | 8 58 | 22 12 1 | 17 14 | | 22 12 47 | 17 1 |
| | 23 | B | | 9 0 | 23 13 2 | 16 57 | | 23 13 48 | 16 44 |
| vi. 4. | 24 | C | | 9 2 | 24 14 3 | 16 39 | | 24 14 49 | 16 26 |
| | 25 | D | Conuer | 9 4 | 25 15 4 | 16 22 | | 25 15 50 | 16 9 |
| 3. xiiii 2ii | 26 | E | of Paul. | 9 6 | 26 16 5 | 16 4 | | 26 16 51 | 15 50 |
| | 7 | F | | 9 9 | 27 17 5 | 15 45 | | 27 17 51 | 15 31 |
| 5. xi. | 28 | G | | 9 12 | 28 18 6 | 15 26 | | 28 18 52 | 15 12 |
| xix. 7. | 29 | A | | 9 15 | 29 19 6 | 15 8 | | 29 19 52 | 14 54 |
| | 30 | B | | 9 18 | 30 20 7 | 14 49 | | 30 20 53 | 14 34 |
| 2. viii. | 31 | C | | 9 21 | 31 21 8 | 14 30 | | 31 21 54 | 14 15 |

| of the Sunne. | ☉ in ♍ second yere. | | ☉ in ♍ third yeare | |
|---|---|---|---|---|
| | D. M. | D. M. | D. M. | D. M. |
| 1 | 21 11 | 21 49 | 1 20 55 | 21 52 |
| 2 | 22 12 | 21 40 | 2 21 56 | 21 43 |
| 3 | 23 13 | 21 30 | 3 22 57 | 21 33 |
| 4 | 24 14 | 21 20 | 4 23 58 | 21 23 |
| 5 | 25 15 | 21 8 | 5 24 59 | 21 12 |
| 6 | 26 16 | 20 57 | 6 26 0 | 21 0 |
| 7 | 27 17 | 20 46 | 7 27 1 | 20 49 |
| 8 | 28 18 | 20 34 | 8 28 2 | 20 37 |
| 9 | 29 20 | 20 21 | 9 29 4 | 20 24 |
| 10 | ♒ 21 | 20 8 | 10 ♒ 4 | 20 11 |
| 11 | 1 22 | 19 54 | 11 1 5 | 19 58 |
| 12 | 2 23 | 19 41 | 12 2 7 | 19 45 |
| 13 | 3 24 | 19 27 | 13 3 8 | 19 30 |
| 14 | 4 25 | 19 12 | 14 4 9 | 19 16 |
| 15 | 5 26 | 18 58 | 15 5 10 | 19 2 |
| 16 | 6 27 | 18 42 | 16 6 11 | 18 46 |
| 17 | 7 28 | 18 27 | 17 7 12 | 18 31 |
| 18 | 8 29 | 18 12 | 18 8 13 | 18 16 |
| 19 | 9 30 | 17 56 | 19 9 14 | 17 59 |
| 20 | 10 30 | 17 39 | 20 10 14 | 17 43 |
| 21 | 11 31 | 17 23 | 21 11 15 | 17 27 |
| 22 | 12 32 | 17 6 | 22 12 16 | 17 10 |
| 23 | 13 33 | 16 48 | 23 13 17 | 16 52 |
| 24 | 14 34 | 16 31 | 24 14 18 | 16 35 |
| 25 | 15 35 | 16 13 | 25 15 19 | 16 18 |
| 26 | 16 36 | 15 55 | 26 16 20 | 15 59 |
| 27 | 17 36 | 15 36 | 27 17 20 | 15 41 |
| 28 | 18 37 | 15 17 | 28 18 21 | 15 22 |
| 29 | 19 37 | 14 59 | 29 19 21 | 15 4 |
| 30 | 20 38 | 14 40 | 30 20 22 | 14 44 |
| 31 | 21 39 | 14 20 | 31 21 23 | 14 25 |

South Declination.

## Certaine of the most notable fixed Starres of the 1.2.& 3. bignes, their Magnitude, Declination, and right ascention: whereby you may readily find when any of them are in rule for obseruation.

1

Whales taile is a starre of the 3. bignes, whose declination is 20. degrees, 12. minutes south, and the right ascention therof is 24. minutes of an houre.

2

Whales backe of the third bignes, declination 12. deg. 20. minutes south, and right ascention 50. minutes.

3

Rams horne is a starre of the third bignes, whose declination is 17. degrees, 17. minutes north, and his right ascention is 1. houre, 32. min.

4

Rams head of the third bignes, declination 21. degrees, 33. minutes north, right ascention 1. houre 46. minutes.

## February hath 28. daies.

| The Prime. | | | | Leng. of the day. | Declination and true place ☉ in ♒ Leap yere. | | | | South Declination. | ☉ in ♒ First yere | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | H.M. | D. | M. | D. | M. | | D. | M. | M. | D. |
| | 1 | D | Fast. | 9 30 | 1 | 22 9 | 14 | 10 | | 1 | 22 54 | 13 | 55 |
| 7. xvi. | 2 | E | Purific. | 9 33 | 2 | 23 9 | 13 | 50 | | 2 | 23 55 | 13 | 35 |
| | 3 | F | of Mary | 9 37 | 3 | 24 10 | 13 | 30 | | 3 | 24 56 | 13 | 14 |
| v. | 4 | G | | 9 41 | 4 | 25 11 | 13 | 10 | | 4 | 25 56 | 12 | 54 |
| xiii. 12. | 5 | A | Agathe | 9 45 | 5 | 26 11 | 12 | 50 | | 5 | 26 57 | 12 | 34 |
| | 6 | B | | 9 50 | 6 | 27 11 | 12 | 29 | | 6 | 27 57 | 12 | 13 |
| 4. ii. | 7 | C | | 9 44 | 7 | 28 12 | 12 | 8 | | 7 | 28 58 | 11 | 52 |
| x. 4. | 8 | D | | 9 58 | 8 | 29 12 | 11 | 47 | | 8 | 29 58 | 11 | 31 |
| xviii. 3. | 9 | E | | 10 2 | 9 | ♓ 13 | 11 | 26 | | 9 | ♓ 58 | 11 | 10 |
| | 10 | F | | 10 6 | 10 | 1 13 | 11 | 5 | | 10 | 1 59 | 10 | 48 |
| 2. vii. | 11 | G | | 10 9 | 11 | 2 14 | 10 | 43 | | 11 | 2 59 | 10 | 26 |
| | 12 | A | | 10 12 | 12 | 3 14 | 10 | 21 | | 12 | 3 59 | 10 | 4 |
| 7. xv. | 13 | B | | 10 15 | 13 | 4 14 | 9 | 59 | | 13 | 4 59 | 9 | 42 |
| | 14 | C | Valent. | 10 18 | 14 | 5 14 | 9 | 37 | | 14 | 6 0 | 9 | 20 |
| 8. iiii | 15 | D | | 10 22 | 15 | 6 15 | 9 | 15 | | 15 | 7 0 | 8 | 58 |
| 3. xii. | 16 | E | | 10 26 | 16 | 7 15 | 8 | 53 | | 16 | 8 0 | 8 | 35 |
| i. 6. | 17 | F | | 10 30 | 17 | 8 15 | 8 | 30 | | 17 | 9 0 | 8 | 13 |
| | 18 | G | | 10 34 | 18 | 9 15 | 8 | 7 | | 18 | 10 0 | 7 | 50 |
| 5. ix. | 19 | A | | 10 37 | 19 | 10 15 | 7 | 44 | | 19 | 11 0 | 7 | 28 |
| xvii. 2. | 20 | B | | 10 40 | 20 | 11 15 | 7 | 22 | | 20 | 12 0 | 7 | 5 |
| | 21 | C | | 10 46 | 21 | 12 15 | 6 | 59 | | 21 | 13 0 | 6 | 42 |
| | 22 | D | | 10 50 | 22 | 13 15 | 6 | 36 | | 22 | 14 0 | 6 | 19 |
| 3. vi. | 23 | E | Fast. | 10 54 | 23 | 14 15 | 6 | 13 | | 23 | 15 0 | 5 | 55 |
| xiiii. 11 | 24 | F | Mathia. | 10 58 | 24 | 15 15 | 5 | 49 | | 24 | 16 0 | 5 | 32 |
| 2. iii. | 25 | G | when it is | 11 2 | 25 | 16 15 | 5 | 26 | | 25 | 17 0 | 5 | 9 |
| xi. 5. | 26 | A | leap yeare | 11 7 | 26 | 17 15 | 5 | 3 | | 26 | 18 0 | 4 | 45 |
| | 27 | B | February | 11 12 | 27 | 18 14 | 4 | 39 | | 27 | 18 59 | 4 | 22 |
| 2. xix. | 28 | C | hath 29. | 11 16 | 28 | 29 14 | 4 | 16 | | 28 | 19 59 | 3 | 58 |
| | 29 | | daies and | | 29 | 20 14 | 3 | 52 | | | | | |
| | | | then is S. | | | | | | | | | | |
| | | | Mathias | | | | | | | | | | |
| | | | the 25. da | | | | | | | | | | |

of the Sunne.

| ☉ in ♒ second yere | | | ☉ in ♒ third yere | | |
|---|---|---|---|---|---|
| | D,M. | D,M, | | D,M | D,M, |
| 1 | 22 36 | 14 0 | 1 | 22 24 | 14 6 |
| 2 | 23 40 | 13 40 | 2 | 23 25 | 13 45 |
| 3 | 24 41 | 13 20 | 3 | 24 26 | 13 25 |
| 4 | 25 41 | 13 0 | 4 | 25 26 | 13 4 |
| 5 | 26 41 | 12 40 | 5 | 26 26 | 12 44 |
| 6 | 27 42 | 12 20 | 6 | 27 26 | 12 24 |
| 7 | 28 42 | 11 58 | 7 | 28 27 | 12 3 |
| 8 | 29 43 | 11 36 | 8 | 29 27 | 11 42 |
| 9 | ♓ 43 | 11 15 | 9 | ♓ 28 | 11 21 |
| 10 | 1 44 | 10 53 | 10 | 1 28 | 11 0 |
| 11 | 2 44 | 10 31 | 11 | 2 29 | 10 38 |
| 12 | 3 44 | 10 10 | 12 | 3 29 | 10 16 |
| 13 | 4 44 | 9 48 | 13 | 4 29 | 9 54 |
| 14 | 5 45 | 9 26 | 14 | 5 29 | 9 32 |
| 15 | 6 45 | 9 4 | 15 | 6 30 | 9 10 |
| 16 | 7 45 | 8 41 | 16 | 7 30 | 8 48 |
| 17 | 8 45 | 8 18 | 17 | 8 30 | 8 24 |
| 18 | 9 45 | 7 56 | 18 | 9 30 | 8 2 |
| 19 | 10 45 | 7 33 | 19 | 10 30 | 7 39 |
| 20 | 11 45 | 7 11 | 20 | 11 30 | 7 17 |
| 21 | 12 45 | 6 48 | 21 | 12 30 | 6 54 |
| 22 | 13 45 | 6 25 | 22 | 13 30 | 6 31 |
| 23 | 14 45 | 6 2 | 23 | 14 30 | 6 8 |
| 24 | 15 45 | 5 38 | 24 | 15 30 | 5 44 |
| 25 | 16 45 | 5 15 | 25 | 16 30 | 5 21 |
| 26 | 17 45 | 4 52 | 26 | 17 30 | 4 58 |
| 27 | 18 45 | 4 28 | 27 | 18 29 | 4 34 |
| 28 | 19 44 | 4 5 | 28 | 19 29 | 4 11 |

South Declination.

5

Bulls eye is a ſtarre of the firſt bigneſſe, whoſe declination is 15. degrees 38. minutes nozth, and right aſcention 4. houres 13. minutes.

6

Orions left foote of the firſt bigneſſe, declination 8. degrees 42. minutes ſouth, right aſcention 4. houres 55. minutes.

7

Orions left ſhoulder of the ſecond bigneſſe, declination 5. degrees 56. minutes nozth, right aſcention 5. hour. 4. minutes.

8

Firſt in Orions girdle of the ſecond bignes, declination 38. minutes ſouth, right aſcention 5. houres 12. minuts.

9

Orions right ſhoulder of the firſt bignes, declination 6. degrees 17. minutes nozth, right aſcention 5. houres 34. minutes.

March hath 31. daies.

| The Prime. | | | | Leng of the day. | Declination and true place ☉ in ♓ Leape yeare | | | South Declination. | ☉ in ♓ First yere | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | H,M. | D,M. | D. M | | | D.M. | D.M. |
| | 1 | D | Dauid. | 11 20 | 1 21 | 14 3 30 | | | 1 20 59 | 3 35 |
| 8. viii. | 2 | E | | 11 24 | 2 22 | 14 3 6 | | | 2 21 59 | 3 11 |
| xvi. 11. | 3 | F | | 11 28 | 3 23 | 13 2 42 | | | 3 22 58 | 2 47 |
| | 4 | G | | 11 32 | 4 24 | 13 2 18 | | | 4 23 58 | 2 23 |
| 10. v. | 5 | A | | 11 36 | 5 25 | 13 1 55 | | | 5 24 57 | 2 0 |
| | 6 | B | | 11 40 | 6 26 | 12 1 30 | | | 6 25 57 | 1 36 |
| 1. xiii. ii. 6 | 7 | C | | 11 44 | 7 27 | 12 1 7 | | | 7 26 57 | 1 13 |
| | 8 | D | | 11 48 | 8 28 | 11 0 43 | | | 8 27 56 | 0 50 |
| 8. x. | 9 | E | | 11 52 | 9 29 | 11 0 21 | | | 9 28 55 | 0 26 |
| | 10 | F | | 11 56 | 10 ♈ | 10 0 4 | | | 10 29 55 | 0 2 |
| 3. xviii. | 11 | G | Grego. | 12 0 | 11 1 | 9 0 28 | | | 11 ♈ 54 | 0 22 |
| | 12 | A | | 12 4 | 12 2 | 9 0 52 | | | 12 1 53 | 0 45 |
| 8. vii. | 13 | B | | 12 8 | 13 3 | 8 1 15 | | | 13 2 53 | 1 9 |
| xv. 9. | 14 | C | | 12 12 | 14 4 | 7 1 38 | | | 14 3 52 | 1 32 |
| | 15 | D | | 12 16 | 15 5 | 6 2 2 | | | 15 4 51 | 1 57 |
| 2. iiii. | 16 | E | | 12 20 | 16 6 | 5 2 25 | | | 16 5 50 | 2 19 |
| xii. 6. | 17 | F | Edward | 12 24 | 17 7 | 5 2 49 | | | 17 6 49 | 2 42 |
| | 18 | G | | 12 28 | 18 8 | 4 3 13 | | | 18 7 49 | 3 6 |
| 5. i. | 19 | A | | 12 32 | 19 9 | 3 3 36 | | | 19 8 48 | 3 30 |
| ix. 10. | 20 | B | Benedi. | 12 36 | 20 10 | 2 3 59 | | | 20 9 47 | 3 53 |
| | 21 | C | | 12 40 | 21 11 | 1 4 22 | | | 21 10 46 | 4 16 |
| xvii. 6. | 22 | D | | 12 43 | 22 12 | 0 4 45 | | | 22 11 45 | 4 39 |
| | 23 | E | | 12 47 | 23 12 | 59 5 9 | | | 23 12 44 | 5 2 |
| 11. vi. | 24 | F | Fast. | 12 50 | 24 13 | 58 5 32 | | | 24 13 43 | 5 26 |
| 1. xiiii. | 25 | G | Anuntiation of | 12 54 | 25 14 | 57 5 54 | | | 25 14 42 | 5 48 |
| iii. 8. | 26 | A | | 12 58 | 26 15 | 55 6 17 | | | 26 15 41 | 6 11 |
| | 27 | B | Mary. | 13 3 | 27 16 | 54 6 40 | | | 27 16 39 | 6 34 |
| 9. xi. | 28 | C | | 13 6 | 28 17 | 53 7 3 | | | 28 17 38 | 6 57 |
| | 29 | D | | 13 10 | 29 18 | 52 7 25 | | | 29 18 37 | 7 19 |
| xix. 9. | 30 | E | | 13 14 | 30 19 | 50 7 47 | | | 30 19 36 | 7 42 |
| | 31 | F | | 13 20 | 31 20 | 49 8 9 | | | 31 20 35 | 8 3 |

North Declination.

March.

of the Sunne.

| ☉ in ♓ second yere | | | | ☉ in ♓ third yere | | | |
|---|---|---|---|---|---|---|---|
| | D,M. | D,M, | | | D,M | D,M, | |
| 1 | 20 44 | 3 41 | South Declination. | 1 | 20 29 | 3 47 | South Declination. |
| 2 | 21 44 | 3 18 | | 2 | 21 29 | 3 24 | |
| 3 | 22 43 | 2 54 | | 3 | 22 28 | 3 0 | |
| 4 | 23 43 | 2 30 | | 4 | 23 28 | 2 36 | |
| 5 | 24 42 | 2 6 | | 5 | 24 28 | 2 12 | |
| 6 | 25 42 | 1 43 | | 6 | 25 28 | 1 49 | |
| 7 | 26 42 | 1 18 | | 7 | 26 28 | 1 25 | |
| 8 | 27 41 | 0 56 | | 8 | 27 27 | 1 1 | |
| 9 | 28 40 | 0 32 | | 9 | 28 26 | 0 38 | |
| 10 | 29 40 | 0 8 | | 10 | 29 26 | 0 14 | |
| 11 | ♈ 39 | 0 16 | North Declination. | 11 | ♈ 25 | 0 10 | North Declination. |
| 12 | 1 38 | 0 39 | | 12 | 1 24 | 0 34 | |
| 13 | 2 38 | 1 3 | | 13 | 2 23 | 0 57 | |
| 14 | 3 37 | 1 27 | | 14 | 3 22 | 1 21 | |
| 15 | 4 36 | 1 50 | | 15 | 4 21 | 1 44 | |
| 16 | 5 35 | 2 13 | | 16 | 5 20 | 2 8 | |
| 17 | 6 34 | 2 36 | | 17 | 6 19 | 2 31 | |
| 18 | 7 34 | 3 0 | | 18 | 7 19 | 2 54 | |
| 19 | 8 33 | 3 24 | | 19 | 8 18 | 3 18 | |
| 20 | 9 32 | 3 48 | | 20 | 9 17 | 3 42 | |
| 21 | 10 31 | 4 10 | | 21 | 10 16 | 4 4 | |
| 22 | 11 30 | 4 33 | | 22 | 11 15 | 4 28 | |
| 23 | 12 29 | 4 56 | | 23 | 12 14 | 4 50 | |
| 24 | 13 28 | 5 19 | | 24 | 13 13 | 5 14 | |
| 25 | 14 26 | 5 42 | | 25 | 14 12 | 5 37 | |
| 26 | 15 26 | 6 5 | | 26 | 15 11 | 5 59 | |
| 27 | 16 24 | 6 28 | | 27 | 16 9 | 6 23 | |
| 28 | 17 23 | 6 50 | | 28 | 17 8 | 6 45 | |
| 29 | 18 22 | 7 13 | | 29 | 18 7 | 7 8 | |
| 30 | 19 21 | 7 36 | | 30 | 19 6 | 7 30 | |
| 31 | 20 19 | 7 57 | | 31 | 20 4 | 7 51 | |

10

The great Dog is a starre of the first bignes, whose declination is 16. degr. 12. minutes southwards, and his right ascention 6. houres 27. minutes.

11

The little Dog is a starre of the first bignesse, declination is 6. degrees 13. minutes north, right ascention 7. houres 18. minutes.

12

Brightest in Hidra is a star of the second bignes, declination 6. degrees, 53. minutes south, right ascention 9. hour. 8. minutes.

13

Lyons heart of the first bignes, declination 13. degrees 55. minutes north, right ascention 9. houres 57. minutes.

14

Lyons necke of the second bignes, declination 21. degrees 52. minutes north, right ascention 9. houres 46 minutes.

Aprill

## Aprill hath 30. daies.

| The Prime. | | | | Leng of the day. | Declination and true place ☉ in ♈ Leape yeare | | North Declination. | ☉ in ♈ First yere | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | H.M. | D.M. | D.M. | | D.M. | D.M. |
| | 1 | G | | 13 30 | 1 21 48 | 8 31 | | 1 21 33 | 8 25 |
| xvi. 4. | 2 | A | | 13 34 | 2 22 46 | 8 53 | | 2 22 32 | 8 47 |
| | 3 | B | | 13 38 | 3 23 45 | 9 15 | | 3 23 30 | 9 9 |
| v. | 4 | C | Ambro. | 13 42 | 4 24 43 | 9 36 | | 4 24 29 | 9 31 |
| xiii. 8. | 5 | D | | 13 46 | 5 25 42 | 9 58 | | 5 25 28 | 9 52 |
| 7. ii. | 6 | E | | 13 50 | 6 26 40 | 10 19 | | 6 26 26 | 10 14 |
| x. 5. | 7 | F | | 13 53 | 7 27 39 | 10 40 | | 7 27 24 | 10 35 |
| | 8 | G | | 13 56 | 8 28 37 | 11 1 | | 8 28 23 | 10 55 |
| | 9 | A | | 13 59 | 9 29 35 | 11 22 | | 9 29 21 | 11 16 |
| 9. xviii. | 10 | B | | 14 2 | 10 ♉ 34 | 11 43 | | 10 ♉ 19 | 11 37 |
| vii. 8. | 11 | C | | 14 5 | 11 1 32 | 12 3 | | 11 1 18 | 11 57 |
| | 12 | D | | 14 8 | 12 2 30 | 12 23 | | 12 2 16 | 12 18 |
| 2. xv. | 13 | E | | 14 12 | 13 3 29 | 12 43 | | 13 3 14 | 12 38 |
| iiii. 7. | 14 | F | | 14 16 | 14 4 27 | 13 2 | | 14 4 13 | 12 57 |
| | 15 | G | | 14 20 | 15 5 25 | 13 21 | | 15 5 11 | 13 17 |
| 9. xii. | 16 | A | | 14 24 | 16 6 23 | 13 41 | | 16 6 9 | 13 36 |
| i. 9. | 17 | B | | 14 28 | 17 7 21 | 14 0 | | 17 7 7 | 13 55 |
| | 18 | C | | 14 32 | 18 8 19 | 14 19 | | 18 8 5 | 14 15 |
| ix, 2. | 19 | D | | 14 36 | 19 9 17 | 14 37 | | 19 9 3 | 14 33 |
| | 20 | E | | 14 40 | 20 10 15 | 14 56 | | 20 10 1 | 14 51 |
| 7. xvii, | 21 | F | | 14 44 | 21 11 13 | 15 14 | | 21 10 59 | 15 10 |
| vi. | 22 | G | | 14 47 | 22 12 12 | 15 32 | | 22 11 57 | 15 27 |
| xiiii. 8. | 23 | A | S. Geo. | 14 50 | 23 13 10 | 15 50 | | 23 12 56 | 15 46 |
| | 24 | B | Faſt. | 14 53 | 24 14 7 | 16 7 | | 24 13 54 | 16 3 |
| 7. iii. | 25 | C | S. Mark | 14 56 | 25 15 5 | 16 25 | | 25 14 51 | 16 20 |
| xi. 2. | 26 | D | | 14 59 | 26 16 3 | 16 41 | | 26 15 49 | 16 37 |
| | 27 | E | | 15 2 | 27 17 1 | 16 57 | | 27 16 47 | 16 53 |
| xix. 7. | 28 | F | | 15 5 | 28 17 59 | 17 14 | | 28 17 45 | 17 10 |
| | 29 | G | | 15 8 | 29 18 57 | 17 30 | | 29 18 43 | 17 26 |
| viii. 2. | 30 | A | | 15 12 | 30 19 55 | 17 46 | | 30 19 41 | 17 41 |

## Of the Sunne.

| | ☉ in ♈ second yere | | ☉ ♈ third yere. | |
|---|---|---|---|---|
| | D. M. | D. M. | D. M. | D. M. |
| 1 | 21 18 | 8 19 | 21 3 | 8 14 |
| 2 | 22 17 | 8 41 | 22 2 | 8 35 |
| 3 | 23 15 | 9 3 | 23 0 | 8 58 |
| 4 | 24 14 | 9 25 | 23 59 | 9 20 |
| 5 | 25 12 | 9 46 | 24 57 | 9 42 |
| 6 | 26 11 | 10 8 | 25 56 | 10 3 |
| 7 | 27 9 | 10 30 | 26 54 | 10 24 |
| 8 | 28 8 | 10 50 | 27 53 | 10 45 |
| 9 | 29 6 | 11 11 | 28 51 | 11 6 |
| 10 | ♉ 4 | 11 32 | 29 49 | 11 27 |
| 11 | 1 3 | 11 52 | ♉ 48 | 11 47 |
| 12 | 2 1 | 12 12 | 1 46 | 12 7 |
| 13 | 3 59 | 12 33 | 2 44 | 12 28 |
| 14 | 4 58 | 12 53 | 3 43 | 12 47 |
| 15 | 5 56 | 13 12 | 4 41 | 13 7 |
| 16 | 6 54 | 13 32 | 5 39 | 13 26 |
| 17 | 7 52 | 13 50 | 6 37 | 13 46 |
| 18 | 8 50 | 14 10 | 7 35 | 14 5 |
| 19 | 9 48 | 14 29 | 8 33 | 14 23 |
| 20 | 10 46 | 14 46 | 9 31 | 14 42 |
| 21 | 11 44 | 15 5 | 10 29 | 15 0 |
| 22 | 12 42 | 15 23 | 11 27 | 15 19 |
| 23 | 13 41 | 15 41 | 12 26 | 15 36 |
| 24 | 13 39 | 15 59 | 13 24 | 15 34 |
| 25 | 14 36 | 16 16 | 14 21 | 16 11 |
| 26 | 15 34 | 16 33 | 15 19 | 16 28 |
| 27 | 16 32 | 16 49 | 16 17 | 16 45 |
| 28 | 17 30 | 17 5 | 17 15 | 17 1 |
| 29 | 18 28 | 17 22 | 18 13 | 17 18 |
| 30 | 19 26 | 17 38 | 19 12 | 17 34 |

North Declination.

15

Lyons backe is a ſtarre of the ſecond bignes, whoſe declination is 22. degrées 43. minutes northward, and his right aſcention is 10. houres 52 minutes.

16

Lyons tayle of the firſt bignes declination 16. degrées 50. minutes north, right aſcention 11. houres 29. minutes.

17

Rauens wing of the third bigneſſe, declination 15. degrées 16. minuts ſouth, right aſcention 11, houres 56. minutes,

18

Virgins ſpike of the firſt bignes, declination 9. degrées ſouth, right aſcention 13 hou. 5. minutes.

| The Prime. | | | | Leng of the day. | Declination and true place ☉ in ♈ Leape yeare | | | North Declination. | ☉ in ♈ First yere | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | H.M. | D,M. | | D. M | | D.M. | | D.M. |
| | 1 | G | | 13 30 | 1 | 21 48 | 8 31 | | 1 | 21 33 | 8 25 |
| xvi. 4. | 2 | A | | 13 34 | 2 | 22 46 | 8 53 | | 2 | 22 32 | 8 47 |
| | 3 | B | | 13 38 | 3 | 23 45 | 9 15 | | 3 | 23 30 | 9 9 |
| v. | 4 | C | Ambro. | 13 42 | 4 | 24 43 | 9 36 | | 4 | 24 29 | 9 31 |
| xiii. 8. | 5 | D | | 13 46 | 5 | 25 42 | 9 58 | | 5 | 25 28 | 9 52 |
| 7. ii. | 6 | E | | 13 50 | 6 | 26 40 | 10 19 | | 6 | 26 26 | 10 14 |
| x. 5. | 7 | F | | 13 53 | 7 | 27 39 | 10 40 | | 7 | 27 24 | 10 35 |
| | 8 | G | | 13 56 | 8 | 28 37 | 11 1 | | 8 | 28 23 | 10 55 |
| | 9 | A | | 13 59 | 9 | 29 35 | 11 22 | | 9 | 29 21 | 11 16 |
| 9. xviii. | 10 | B | | 14 2 | 10 | ♉ 34 | 11 43 | | 10 | ♉ 19 | 11 37 |
| vii. 8. | 11 | C | | 14 5 | 11 | 1 32 | 12 3 | | 11 | 1 18 | 11 57 |
| | 12 | D | | 14 8 | 12 | 2 30 | 12 23 | | 12 | 2 16 | 12 18 |
| 2. xv. | 13 | E | | 14 12 | 13 | 3 29 | 12 43 | | 13 | 3 14 | 12 38 |
| iiii. 7. | 14 | F | | 14 16 | 14 | 4 27 | 13 2 | | 14 | 4 13 | 12 57 |
| | 15 | G | | 14 20 | 15 | 5 25 | 13 21 | | 15 | 5 11 | 13 17 |
| 9. xii. | 16 | A | | 14 24 | 16 | 6 23 | 13 41 | | 16 | 6 9 | 13 36 |
| i. 9. | 17 | B | | 14 28 | 17 | 7 21 | 14 0 | | 17 | 7 7 | 13 55 |
| | 18 | C | | 14 32 | 18 | 8 19 | 14 19 | | 18 | 8 5 | 14 15 |
| ix, 2. | 19 | D | | 14 36 | 19 | 9 17 | 14 37 | | 19 | 9 3 | 14 33 |
| | 20 | E | | 14 40 | 20 | 10 15 | 14 56 | | 20 | 10 1 | 14 51 |
| 7. xvii, | 21 | F | | 14 44 | 21 | 11 13 | 15 14 | | 21 | 10 59 | 15 10 |
| vi. | 22 | G | | 14 47 | 22 | 12 12 | 15 32 | | 22 | 11 57 | 15 27 |
| xiiii. 8. | 23 | A | S. Geo. | 14 50 | 23 | 13 10 | 15 50 | | 23 | 12 56 | 15 46 |
| | 24 | B | Faſt. | 14 53 | 24 | 14 7 | 16 7 | | 24 | 13 54 | 16 3 |
| 7. iii. | 25 | C | S. Mark | 14 56 | 25 | 15 5 | 16 25 | | 25 | 14 51 | 16 20 |
| xi. 2. | 26 | D | | 14 59 | 26 | 16 3 | 16 41 | | 26 | 15 49 | 16 37 |
| | 27 | E | | 15 2 | 27 | 17 1 | 16 57 | | 27 | 16 47 | 16 53 |
| xix. 7. | 28 | F | | 15 5 | 28 | 17 59 | 17 14 | | 28 | 17 45 | 17 10 |
| | 29 | G | | 15 8 | 29 | 18 57 | 17 30 | | 29 | 18 43 | 17 26 |
| viii. 2. | 30 | A | | 15 12 | 30 | 19 55 | 17 46 | | 30 | 19 41 | 17 41 |

## Of the Sunne.

| | ☉ in ♈ second yere | | | ☉ ♈ third yere. | | |
|---|---|---|---|---|---|---|
| | D. | M. | D. | M. | D. | M. |
| 1 | 21 | 18 | 8 | 19 | 21 | 3 | 8 | 14 |
| 2 | 22 | 17 | 8 | 41 | 22 | 2 | 8 | 35 |
| 3 | 23 | 15 | 9 | 3 | 23 | 0 | 8 | 58 |
| 4 | 24 | 14 | 9 | 25 | 23 | 59 | 9 | 20 |
| 5 | 25 | 12 | 9 | 46 | 24 | 57 | 9 | 42 |
| 6 | 26 | 11 | 10 | 8 | 25 | 56 | 10 | 3 |
| 7 | 27 | 9 | 10 | 30 | 26 | 54 | 10 | 24 |
| 8 | 28 | 8 | 10 | 50 | 27 | 53 | 10 | 45 |
| 9 | 29 | 6 | 11 | 11 | 28 | 51 | 11 | 6 |
| 10 | ♉ | 4 | 11 | 32 | 29 | 49 | 11 | 27 |
| 11 | 1 | 3 | 11 | 52 | ♉ | 48 | 11 | 47 |
| 12 | 2 | 1 | 12 | 12 | 1 | 46 | 12 | 7 |
| 13 | 3 | 59 | 12 | 33 | 2 | 44 | 12 | 28 |
| 14 | 4 | 58 | 12 | 53 | 3 | 43 | 12 | 47 |
| 15 | 5 | 56 | 13 | 12 | 4 | 41 | 13 | 7 |
| 16 | 6 | 54 | 13 | 32 | 5 | 39 | 13 | 26 |
| 17 | 7 | 52 | 13 | 50 | 6 | 37 | 13 | 46 |
| 18 | 8 | 50 | 14 | 10 | 7 | 35 | 14 | 5 |
| 19 | 9 | 48 | 14 | 29 | 8 | 33 | 14 | 23 |
| 20 | 10 | 46 | 14 | 46 | 9 | 31 | 14 | 42 |
| 21 | 11 | 44 | 15 | 5 | 10 | 29 | 15 | 0 |
| 22 | 12 | 42 | 15 | 23 | 11 | 27 | 15 | 19 |
| 23 | 13 | 41 | 15 | 41 | 12 | 26 | 15 | 36 |
| 24 | 13 | 39 | 15 | 59 | 13 | 24 | 15 | 34 |
| 25 | 14 | 36 | 16 | 16 | 14 | 21 | 16 | 11 |
| 26 | 15 | 34 | 16 | 33 | 15 | 19 | 16 | 28 |
| 27 | 16 | 32 | 16 | 49 | 16 | 17 | 16 | 45 |
| 28 | 17 | 30 | 17 | 5 | 17 | 15 | 17 | 1 |
| 29 | 18 | 28 | 17 | 22 | 18 | 13 | 17 | 18 |
| 30 | 19 | 26 | 17 | 38 | 19 | 12 | 17 | 34 |

North Declination.

15

Lyons backe is a ſtarre of the ſecond bignes, whoſe declination is 22. degrées 43. minutes northward, and his right aſcention is 10. houres 52 minutes.

16

Lyons tayle of the firſt bignes declination 16. degrées 50. minutes north, right-aſcention 11. houres 29. minutes.

17

Rauens wing of the third bigneſſe, declination 15. degrées 16. minuts ſouth, right aſcention 11, houres 56. minutes,

18

Virgins ſpike of the firſt bignes, declination 9. degrées ſouth, right aſcention 13 hou. 5. minutes.

## May hath 31. daies.

| The Prime | | | Fast | Leng. of the day. | Declination and true place. ☉ in ♂ Leape yere | | | ☉ in ♂ First yeare. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | H. M. | D. M. | D. M. | | D. M. | D. M. | |
| II. viii. | 1 | B | Ph. & I. | 15 16 | 1 20 54 | 18 2 | | 1 20 39 | 17 57 | |
| 6. xvi. | 2 | C | | 15 20 | 2 21 52 | 18 17 | | 2 21 37 | 18 13 | |
| v. 9. | 3 | D | Inuent. | 15 23 | 3 22 49 | 18 31 | | 3 22 35 | 18 28 | |
| | 4 | E | crosse. | 15 26 | 4 23 46 | 18 46 | | 4 23 33 | 18 42 | |
| 8. xiii. ii. 4 | 5 | F | | 15 29 | 5 24 44 | 19 0 | | 5 24 30 | 18 56 | |
| | 6 | G | Io. Por. | 15 32 | 6 25 43 | 19 14 | | 6 25 28 | 19 11 | |
| 4. x. | 7 | A | Latin. | 15 35 | 7 26 39 | 19 27 | | 7 26 26 | 19 24 | |
| | 8 | B | | 15 38 | 8 27 38 | 19 41 | | 8 27 23 | 19 38 | |
| xviii. 6. | 9 | C | | 15 40 | 9 28 34 | 19 54 | | 9 28 21 | 19 51 | |
| | 10 | D | | 15 42 | 10 29 33 | 20 6 | | 10 29 18 | 20 3 | |
| 3. vii. | 11 | E | | 15 44 | 11 ♍ 29 | 20 18 | | 11 ♍ 16 | 20 15 | |
| xv. 8. | 12 | F | | 15 46 | 12 1 28 | 20 31 | | 12 1 13 | 20 28 | |
| | 13 | G | | 15 48 | 13 2 25 | 20 42 | | 13 2 11 | 20 39 | |
| 8. iiii. | 14 | A | | 15 50 | 14 3 23 | 20 53 | | 14 3 9 | 20 51 | |
| xii. | 15 | B | | 15 53 | 15 4 21 | 21 4 | | 15 4 6 | 21 1 | |
| | 16 | C | | 15 56 | 16 5 18 | 21 14 | | 16 5 4 | 21 12 | |
| i. | 17 | D | | 15 58 | 17 6 15 | 21 25 | | 17 6 1 | 21 22 | |
| | 18 | E | | 16 0 | 18 7 13 | 21 34 | | 18 6 59 | 21 32 | |
| 6 i x. | 19 | F | Dunstã. | 16 3 | 19 8 9 | 21 44 | | 19 7 56 | 21 41 | |
| xvii. | 20 | G | | 16 6 | 20 9 8 | 21 52 | | 20 8 53 | 21 50 | |
| vi. 8. | 21 | A | | 16 9 | 21 10 4 | 22 1 | | 21 9 51 | 21 59 | |
| | 22 | B | | 16 12 | 22 11 2 | 22 9 | | 22 10 48 | 22 7 | |
| 8. xiiii. | 23 | C | | 16 14 | 23 11 59 | 22 17 | | 23 11 45 | 22 15 | |
| iii. i. | 24 | D | | 16 16 | 24 12 56 | 22 25 | | 24 12 43 | 22 22 | |
| | 25 | E | | 16 18 | 25 13 54 | 22 31 | | 25 13 40 | 22 29 | |
| 10. xi. | 26 | F | August. | 16 20 | 26 14 52 | 22 38 | | 26 14 37 | 22 36 | |
| | 27 | G | | 16 22 | 27 15 48 | 22 45 | | 27 15 35 | 22 42 | |
| I. xix. | 28 | A | | 16 24 | 28 16 45 | 22 50 | | 28 16 32 | 22 49 | |
| | 29 | B | | 16 26 | 29 17 43 | 22 55 | | 29 17 29 | 22 55 | |
| 8. viii. | 30 | C | | 16 27 | 30 18 39 | 23 0 | | 30 18 26 | 22 59 | |
| | 31 | D | | 16 28 | 31 19 38 | 23 5 | | 31 19 24 | 23 5 | |

North Declination

of the Sunne.

| ☉ in ♂ second yere | | | ☉ in ♂ third yere | | |
|---|---|---|---|---|---|
| | D,M. | D,M, | | D,M | D,M, |
| 1 | 20 25 | 17 54 | 1 | 20 10 | 17 50 |
| 2 | 21 23 | 18 9 | 2 | 21 8 | 18 5 |
| 3 | 22 21 | 18 25 | 3 | 22 6 | 18 21 |
| 4 | 23 19 | 18 39 | 4 | 23 4 | 18 35 |
| 5 | 24 16 | 18 53 | 5 | 24 1 | 18 49 |
| 6 | 25 14 | 19 7 | 6 | 24 59 | 19 4 |
| 7 | 26 12 | 19 21 | 7 | 25 57 | 19 18 |
| 8 | 27 9 | 19 34 | 8 | 26 54 | 19 31 |
| 9 | 28 7 | 19 47 | 9 | 27 52 | 19 44 |
| 10 | 29 4 | 20 0 | 10 | 28 49 | 19 57 |
| 11 | o ♌ 2 | 20 12 | 11 | 29 47 | 20 9 |
| 12 | 0 59 | 20 25 | 12 | ♌ 44 | 20 22 |
| 13 | 1 57 | 20 37 | 13 | 1 42 | 20 34 |
| 14 | 2 55 | 20 48 | 14 | 2 40 | 20 45 |
| 15 | 3 52 | 20 59 | 15 | 3 37 | 20 56 |
| 16 | 4 50 | 21 10 | 16 | 4 35 | 21 7 |
| 17 | 5 47 | 21 20 | 17 | 5 32 | 21 17 |
| 18 | 6 45 | 21 30 | 18 | 6 30 | 21 27 |
| 19 | 7 42 | 21 39 | 19 | 7 27 | 21 37 |
| 20 | 8 39 | 21 48 | 20 | 8 24 | 21 46 |
| 21 | 9 37 | 21 56 | 21 | 9 22 | 21 54 |
| 22 | 10 34 | 22 5 | 22 | 10 19 | 22 3 |
| 23 | 11 31 | 22 13 | 23 | 11 16 | 22 11 |
| 24 | 12 29 | 22 21 | 24 | 12 14 | 22 19 |
| 25 | 13 26 | 22 28 | 25 | 13 11 | 22 26 |
| 26 | 14 23 | 22 35 | 26 | 14 8 | 22 33 |
| 27 | 15 21 | 22 41 | 27 | 15 6 | 22 40 |
| 28 | 16 18 | 22 48 | 28 | 16 3 | 22 46 |
| 29 | 17 15 | 22 53 | 29 | 17 0 | 22 52 |
| 30 | 18 12 | 22 58 | 30 | 17 57 | 22 57 |
| 31 | 19 9 | 23 4 | 31 | 19 55 | 23 3 |

North Declination.

19

Arcturus or betwirt boots thighes, is a starre of the first bignes, whose declination is 21. degrées 20. mintes north, and his right ascention is 13 houres, 56. minutes.

20

South Balance of the second bignes, declination 14. degrees 14. minutes south, right ascention 14. houres 30 minutes.

21

North Balance of the second bignes, declination 7. degrées 46. minuts south, right ascention 14. houres 55. minutes.

22

Scorpions heart is a starre of the first bignes, whose declination is 25. degrees 25. minutes south, right ascention 16. houres 6. minutes.

| The Prime. | | | | Leng of the day. | Declination and true place. ☉ in ♊ Leape yeare | | | ☉ in ♊ First yere | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | H,M. | D,M | D. M | | D.M. | D.M. | |
| | 1 | E | | 16 28 | 1 20 35 | 23 9 | | 1 20 21 | 23 9 | |
| 8. v. | 2 | F | | 16 28 | 2 21 33 | 23 14 | | 2 21 18 | 23 13 | |
| I. xiii. | 3 | G | | 16 29 | 3 22 30 | 23 17 | | 3 22 16 | 23 16 | |
| 7. ii. | 4 | A | | 16 29 | 4 23 28 | 23 20 | | 4 23 13 | 23 20 | |
| x. 10. | 5 | B | Bonifa. | 16 29 | 5 24 24 | 23 23 | | 5 24 10 | 23 23 | |
| | 6 | C | | 16 29 | 6 25 21 | 23 25 | | 6 25 7 | 23 24 | |
| | 7 | D | | 16 30 | 7 26 19 | 23 27 | | 7 26 4 | 23 26 | |
| 5. xviii. | 8 | E | | 16 30 | 8 27 16 | 23 28 | | 8 27 2 | 23 28 | |
| vii. 8. | 9 | F | | 16 30 | 9 28 13 | 23 29 | | 9 27 59 | 23 29 | |
| | 10 | G | | 16 30 | 10 29 10 | 23 30 | | 10 28 56 | 23 30 | |
| 9. xv. | 11 | A | Barnab. | 16 30 | 11 ♋ 7 | 23 30 | | 11 29 53 | 23 30 | |
| iiii. | 12 | B | | 16 30 | 12 1 5 | 23 30 | | 12 ♋ 50 | 23 30 | |
| xii. 10. | 13 | C | | 16 30 | 13 2 2 | 23 29 | | 13 1 48 | 23 29 | |
| | 14 | D | | 16 30 | 14 2 59 | 23 28 | | 14 2 45 | 23 28 | |
| | 15 | E | | 16 30 | 15 3 56 | 23 26 | | 15 3 42 | 23 27 | |
| 9. i. | 16 | F | | 16 30 | 16 4 53 | 23 24 | | 16 4 39 | 23 25 | |
| ix, 9. | 17 | G | | 16 29 | 17 5 51 | 23 22 | | 17 5 36 | 23 23 | |
| xvii, 8. | 18 | A | | 16 29 | 18 6 48 | 23 19 | | 18 6 34 | 23 20 | |
| | 19 | B | | 16 28 | 19 7 45 | 23 16 | | 19 7 31 | 23 17 | |
| 8. vi. | 20 | C | Edward | 16 27 | 20 8 42 | 23 13 | | 20 8 28 | 23 13 | |
| xiiii. | 21 | D | | 16 26 | 21 9 39 | 23 8 | | 21 9 25 | 23 10 | |
| | 22 | E | | 16 25 | 22 10 36 | 23 4 | | 22 10 22 | 23 6 | |
| II. iii. | 23 | F | Fast. | 16 24 | 23 11 34 | 22 59 | | 23 11 19 | 23 1 | |
| xi. 3. | 24 | G | Iohn Ba | 16 23 | 24 12 31 | 22 54 | | 24 12 17 | 22 55 | |
| | 25 | A | | 16 22 | 25 13 28 | 23 49 | | 25 13 14 | 22 51 | |
| | 26 | B | | 16 20 | 26 14 25 | 22 43 | | 26 14 11 | 22 45 | |
| II. xix. | 27 | C | | 16 18 | 27 15 22 | 22 37 | | 27 15 8 | 22 38 | |
| viii. 8. | 28 | D | Fast. | 16 16 | 28 16 20 | 22 30 | | 28 16 5 | 22 31 | |
| | 29 | E | S. Peter | 16 14 | 29 17 17 | 22 23 | | 29 17 3 | 22 25 | |
| 8. xvi. | 30 | F | | 16 13 | 30 18 14 | 22 15 | | 30 18 0 | 22 17 | |

North Declination.

of the Sunne.

| ☉ in ♊ second yere | | | | North Declination. | ☉ ♊ third yere. | | | |
|---|---|---|---|---|---|---|---|---|
| | D. | M. | D. | M. | | D. | M. | D. | M. |
| 1 | 20 | 7 | 23 | 8 | 1 | 19 | 52 | 23 | 6 |
| 2 | 21 | 4 | 23 | 12 | 2 | 20 | 49 | 23 | 11 |
| 3 | 22 | 2 | 23 | 15 | 3 | 21 | 47 | 23 | 14 |
| 4 | 22 | 59 | 23 | 19 | 4 | 22 | 44 | 23 | 18 |
| 5 | 23 | 56 | 23 | 22 | 5 | 23 | 41 | 23 | 22 |
| 6 | 24 | 53 | 23 | 24 | 6 | 24 | 38 | 23 | 23 |
| 7 | 25 | 50 | 23 | 26 | 7 | 25 | 35 | 23 | 25 |
| 8 | 26 | 48 | 23 | 28 | 8 | 26 | 33 | 23 | 27 |
| 9 | 27 | 45 | 23 | 29 | 9 | 27 | 30 | 23 | 29 |
| 10 | 28 | 42 | 23 | 30 | 10 | 28 | 27 | 23 | 30 |
| 11 | 29 | 39 | 23 | 30 | 11 | 29 | 24 | 23 | 30 |
| 12 | ♋ | 36 | 23 | 30 | 12 | ♋ | 21 | 23 | 30 |
| 13 | 1 | 34 | 23 | 30 | 13 | 1 | 19 | 23 | 30 |
| 14 | 2 | 31 | 23 | 29 | 14 | 2 | 16 | 23 | 29 |
| 15 | 3 | 28 | 23 | 28 | 15 | 3 | 13 | 23 | 28 |
| 16 | 4 | 25 | 23 | 26 | 16 | 4 | 10 | 23 | 26 |
| 17 | 5 | 22 | 23 | 24 | 17 | 5 | 7 | 23 | 24 |
| 18 | 6 | 20 | 23 | 21 | 18 | 6 | 5 | 23 | 22 |
| 19 | 7 | 17 | 23 | 18 | 19 | 7 | 2 | 23 | 19 |
| 20 | 8 | 14 | 23 | 14 | 20 | 7 | 59 | 23 | 15 |
| 21 | 9 | 11 | 13 | 11 | 21 | 8 | 56 | 23 | 12 |
| 22 | 10 | 8 | 23 | 6 | 22 | 9 | 53 | 23 | 7 |
| 23 | 11 | 5 | 23 | 3 | 23 | 10 | 50 | 23 | 3 |
| 24 | 12 | 3 | 22 | 57 | 24 | 11 | 48 | 22 | 58 |
| 25 | 13 | 0 | 22 | 52 | 25 | 12 | 45 | 22 | 53 |
| 26 | 13 | 57 | 22 | 46 | 26 | 13 | 42 | 22 | 48 |
| 27 | 14 | 54 | 22 | 40 | 27 | 14 | 39 | 22 | 42 |
| 28 | 15 | 51 | 22 | 34 | 28 | 15 | 36 | 22 | 35 |
| 29 | 16 | 49 | 22 | 27 | 29 | 16 | 34 | 22 | 28 |
| 30 | 17 | 46 | 22 | 19 | 30 | 17 | 31 | 22 | 21 |

23

Hercules head is a ſtarre of the third bignes, whoſe declination is 14. degrees 57 minutes noꝛth, and right aſcention 16. houres 56. minutes.

24

Eagles heart is a ſtarre of the ſecond bignes, declination 7. degrees 54. minutes noꝛth, right aſcention 19. houres 32 minutes.

25

Dolphins taile of the third bignes, declination 10. degrees noꝛth, right aſcention 20 houres 16 minutes.

26

Goats taile of the third bignes, declination 17. degrees 51 minutes ſouth, right aſcention 21. houres 27. minute.

July hath 30. daies.

| The Prime. | | | | Leng. of the day. | Declination and true place ☉ in ♋ Leape yere. | | | | ☉ in ♌ Iust yere | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | H. M. | | D. M. | D. M. | | | D. M | M. D. | |
| V | 1 | G | Visitati. | 16 12 | 1 | 19 11 | 22 8 | | 1 | 18 57 | 22 9 | |
| xiii. 8. | 2 | A | Mary: | 16 10 | 2 | 20 8 | 21 59 | | 2 | 19 54 | 22 1 | |
| ii. 7. | 3 | B | Martin. | 16 8 | 3 | 21 6 | 21 50 | | 3 | 20 51 | 21 52 | |
| | 4 | C | | 16 6 | 4 | 22 3 | 21 41 | | 4 | 21 49 | 21 44 | |
| x. 2. | 5 | D | | 16 4 | 5 | 23 0 | 21 32 | | 5 | 22 46 | 21 34 | |
| | 6 | E | Dog. da | 16 1 | 6 | 23 57 | 21 22 | | 6 | 23 43 | 21 25 | |
| xviii. 6. | 7 | F | begin. | 15 57 | 7 | 24 55 | 21 12 | | 7 | 24 40 | 21 15 | |
| | 8 | G | | 15 54 | 8 | 25 52 | 21 1 | | 8 | 25 38 | 21 4 | |
| 9. vii. | 9 | A | | 15 51 | 9 | 26 49 | 20 51 | | 9 | 26 35 | 20 54 | |
| xv. | 10 | B | | 15 48 | 10 | 27 47 | 20 39 | | 10 | 27 32 | 20 43 | |
| iiii. 8. | 11 | C | | 15 46 | 11 | 28 44 | 20 28 | | 11 | 28 30 | 20 31 | |
| | 12 | D | | 15 44 | 12 | 29 41 | 20 16 | | 12 | 29 27 | 20 19 | |
| 3. xii. | 13 | E | | 15 41 | 13 | ♌ 39 | 20 3 | | 13 | ♌ 24 | 20 7 | |
| | 14 | F | | 15 38 | 14 | 1 36 | 19 51 | | 14 | 1 22 | 19 54 | |
| i. 6. | 15 | G | Swithin | 15 35 | 15 | 2 33 | 19 38 | | 15 | 2 19 | 19 42 | |
| | 16 | A | | 15 32 | 16 | 3 31 | 19 25 | | 16 | 3 16 | 19 28 | |
| ix. | 17 | B | | 15 29 | 17 | 4 28 | 19 11 | | 17 | 4 14 | 19 15 | |
| 5. xvii. | 18 | C | | 15 26 | 18 | 5 25 | 18 58 | | 18 | 5 11 | 19 2 | |
| vi. | 19 | D | | 15 23 | 19 | 6 23 | 18 43 | | 19 | 6 8 | 18 47 | |
| xiiii. 8. | 20 | E | Margr. | 15 20 | 20 | 7 20 | 18 29 | | 20 | 7 6 | 18 32 | |
| | 21 | F | | 15 17 | 21 | 8 18 | 18 14 | | 21 | 8 2 | 18 18 | |
| iii. | 22 | G | M g da. | 15 13 | 22 | 9 15 | 17 59 | | 22 | 9 1 | 18 3 | |
| | 23 | A | | 15 10 | 23 | 10 13 | 17 44 | | 23 | 9 58 | 17 47 | |
| 6. xi. | 24 | B | Fast. | 15 7 | 24 | 11 10 | 17 29 | | 24 | 10 56 | 17 32 | |
| | 25 | C | S. Iames | 15 5 | 25 | 12 8 | 17 12 | | 25 | 11 53 | 17 16 | |
| xix. 3. | 26 | D | Anna. | 15 3 | 26 | 13 5 | 16 56 | | 26 | 12 51 | 17 0 | |
| | 27 | E | | 15 0 | 27 | 14 3 | 16 39 | | 27 | 13 48 | 16 43 | |
| 8. viii. | 28 | F | | 14 58 | 28 | 15 0 | 16 23 | | 28 | 14 46 | 16 27 | |
| | 29 | G | | 14 55 | 29 | 15 58 | 16 5 | | 29 | 15 43 | 16 10 | |
| v. 7. | 30 | A | | 14 52 | 30 | 16 56 | 15 48 | | 30 | 16 41 | 15 53 | |
| | 31 | B | | 14 50 | 31 | 17 53 | 15 30 | | 31 | 17 39 | 15 34 | |

North Declination.

| Iuly. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| of the Sunne, | | | | | | | | | |
| in ♋ second yere | | | | | ☉ in ♋ third yere | | | | |
| | D,M. | | D,M, | | | D,M | | D,M, | |
| 1 | 18 | 43 | 22 | 11 | 1 | 18 | 28 | 22 | 13 |
| 2 | 19 | 40 | 22 | 3 | 2 | 19 | 25 | 22 | 5 |
| 3 | 20 | 37 | 21 | 55 | 3 | 20 | 22 | 21 | 56 |
| 4 | 21 | 35 | 21 | 46 | 4 | 21 | 20 | 21 | 48 |
| 5 | 22 | 32 | 21 | 37 | 5 | 22 | 17 | 21 | 39 |
| 6 | 23 | 29 | 21 | 27 | 6 | 23 | 13 | 21 | 29 |
| 7 | 24 | 26 | 21 | 18 | 7 | 24 | 11 | 21 | 20 |
| 8 | 25 | 24 | 21 | 7 | 8 | 25 | 9 | 21 | 9 |
| 9 | 26 | 21 | 20 | 56 | 9 | 26 | 6 | 20 | 59 |
| 10 | 27 | 18 | 20 | 46 | 10 | 27 | 3 | 20 | 48 |
| 11 | 28 | 16 | 20 | 34 | 11 | 28 | 1 | 20 | 37 |
| 12 | 29 | 13 | 20 | 23 | 12 | 28 | 58 | 20 | 25 |
| 13 | 0 ♌ | 10 | 20 | 10 | 13 | 29 | 55 | 20 | 13 |
| 14 | 1 | 8 | 19 | 57 | 14 | 0 ♌ | 53 | 20 | 0 |
| 15 | 2 | 5 | 19 | 45 | 15 | 1 | 50 | 19 | 48 |
| 16 | 3 | 2 | 19 | 32 | 16 | 2 | 47 | 19 | 35 |
| 17 | 4 | 0 | 19 | 18 | 17 | 3 | 45 | 19 | 21 |
| 18 | 4 | 57 | 19 | 4 | 18 | 4 | 42 | 19 | 8 |
| 19 | 5 | 54 | 18 | 50 | 19 | 5 | 39 | 18 | 53 |
| 20 | 6 | 52 | 18 | 36 | 20 | 6 | 37 | 18 | 39 |
| 21 | 7 | 49 | 18 | 22 | 21 | 7 | 35 | 18 | 25 |
| 22 | 8 | 47 | 18 | 6 | 22 | 8 | 32 | 18 | 10 |
| 23 | 9 | 44 | 17 | 51 | 23 | 9 | 29 | 17 | 55 |
| 24 | 10 | 42 | 17 | 36 | 24 | 10 | 27 | 17 | 40 |
| 25 | 11 | 39 | 17 | 20 | 25 | 11 | 24 | 17 | 25 |
| 26 | 12 | 37 | 17 | 4 | 26 | 12 | 22 | 17 | 8 |
| 27 | 13 | 34 | 16 | 47 | 27 | 13 | 19 | 16 | 52 |
| 28 | 14 | 32 | 16 | 31 | 28 | 14 | 17 | 16 | 35 |
| 29 | 15 | 29 | 16 | 15 | 29 | 15 | 14 | 16 | 19 |
| 30 | 16 | 27 | 15 | 57 | 30 | 16 | 12 | 16 | 2 |
| 31 | 17 | 25 | 15 | 40 | 31 | 17 | 10 | 15 | 44 |

North Declination.

27

Pegasus shoulder of the 2. bignes, declina. 12. degr. 58. min. North, right ascention 22. houres 46. minutes.

28

Pegasus Leg, of the third bignes, declination 25. deg. 58. minutes North, right ascention, 22. houres 44. minut

29

Swans taile, is a Starre of the second bignesse, whose declination is 43. degrees 54. minutes North: right ascention 20. houres 30. minutes.

30

The Wagoners right shoulder is a starre of the second bignesse, declination 44. degrees 49. minutes north, and right ascention 5. houres 30. minutes.

31

Hircus the Goate of the first bignesse, declination. 45. degrees 50. minutes, right ascention 4. houres 49. minutes.

32

Lira of the first bignesse, north Declination, 38. degrees 30. minutes, right ascention 18. houres 20. minutes.

## August hath 31. daies.

| The Prime. | | | | Leng. of the day. H.M. | Declination and true place ☉ in ♌ Leape yere. | D.M. | D.M. | North Declination. | ☉ in ♌ First yere | D.M. | M.D. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | C | Lāmas. | 14 46 | 1 | 18 51 | 15 13 | | 1 | 18 36 | 15 17 |
| 2. ii. | 2 | D | | 14 42 | 2 | 19 48 | 14 54 | | 2 | 19 34 | 14 59 |
| | 3 | E | | 14 38 | 3 | 20 46 | 14 36 | | 3 | 20 31 | 14 41 |
| 7.x. | 4 | F | | 14 34 | 4 | 21 44 | 14 18 | | 4 | 21 29 | 14 23 |
| | 5 | G | | 14 30 | 5 | 22 42 | 13 59 | | 5 | 22 27 | 14 4 |
| 9. xviii. | 6 | A | | 14 26 | 6 | 23 40 | 13 40 | | 6 | 23 25 | 13 45 |
| vii. | 7 | B | | 14 22 | 7 | 24 37 | 13 21 | | 7 | 24 23 | 13 25 |
| xv.7. | 8 | C | | 14 18 | 8 | 25 35 | 13 1 | | 8 | 25 20 | 13 6 |
| | 9 | D | | 14 15 | 9 | 26 33 | 12 42 | | 9 | 26 18 | 12 47 |
| 5. iiii. | 10 | E | Lauren. | 14 12 | 10 | 27 31 | 12 23 | | 10 | 27 16 | 12 28 |
| xii. 11. | 11 | F | | 14 9 | 11 | 28 29 | 12 2 | | 11 | 28 14 | 12 7 |
| | 12 | G | | 14 6 | 12 | 29 27 | 11 42 | | 12 | 29 12 | 11 47 |
| | 13 | A | | 14 3 | 13 | ♍ 25 | 11 21 | | 13 | ♍ 10 | 11 27 |
| 3. i. | 14 | B | | 14 0 | 14 | 1 23 | 11 1 | | 14 | 1 8 | 11 6 |
| x. 12. | 15 | C | | 13 56 | 15 | 2 21 | 10 39 | | 15 | 2 6 | 10 45 |
| 1. xvii. | 16 | D | | 13 52 | 16 | 3 19 | 10 19 | | 16 | 3 4 | 10 25 |
| vi. 8. | 17 | E | | 13 50 | 17 | 4 17 | 9 58 | | 17 | 4 2 | 10 4 |
| | 18 | F | | 13 44 | 18 | 5 15 | 9 36 | | 18 | 5 0 | 9 42 |
| 9.xiiii. | 19 | G | | 13 40 | 19 | 6 13 | 9 14 | | 19 | 5 58 | 9 20 |
| | 20 | A | | 13 35 | 20 | 7 11 | 8 54 | | 20 | 6 56 | 8 59 |
| 10.iii. | 21 | B | | 13 30 | 21 | 8 9 | 8 32 | | 21 | 7 54 | 8 37 |
| xi. 10. | 22 | C | | 13 25 | 22 | 9 8 | 8 10 | | 22 | 8 52 | 8 16 |
| | 23 | D | Fast. | 13 20 | 23 | 10 6 | 7 48 | | 23 | 9 51 | 7 53 |
| | 24 | E | Barthol | 13 15 | 24 | 11 4 | 7 26 | | 24 | 10 49 | 7 32 |
| 10. xix. | 25 | F | Apostle | 13 10 | 25 | 12 2 | 7 4 | | 25 | 11 47 | 7 9 |
| viii. | 26 | G | | 13 6 | 26 | 13 1 | 6 42 | | 26 | 12 45 | 6 47 |
| xvi. 8. | 27 | A | | 13 2 | 27 | 13 59 | 6 19 | | 27 | 13 44 | 6 25 |
| | 28 | B | | 12 58 | 28 | 14 58 | 5 55 | | 28 | 14 42 | 6 2 |
| 7. v. | 29 | C | Behed. | 12 54 | 29 | 15 56 | 5 33 | | 29 | 15 41 | 5 39 |
| xiii. 5. | 30 | D | of Iohn | 12 51 | 30 | 16 54 | 5 11 | | 30 | 16 41 | 5 16 |
| | 31 | E | | 12 48 | 31 | 17 | 4 48 | | 31 | 17 40 | 4 52 |

52

of the Sunne.

| ☉ in ♌ second yere | | | ☉ in ♌ third yere | | |
|---|---|---|---|---|---|
| | D,M. | D,M. | | D,M | D,M, |
| 1 | 18 22 | 15 22 | 1 | 18 7 | 15 26 |
| 2 | 19 20 | 15 4 | 2 | 19 5 | 15 8 |
| 3 | 20 17 | 14 46 | 3 | 20 2 | 14 50 |
| 4 | 21 15 | 14 27 | 4 | 21 0 | 14 32 |
| 5 | 22 13 | 14 9 | 5 | 21 58 | 14 13 |
| 6 | 23 11 | 13 49 | 6 | 22 56 | 13 54 |
| 7 | 24 9 | 13 30 | 7 | 23 54 | 13 35 |
| 8 | 25 6 | 13 11 | 8 | 24 51 | 13 16 |
| 9 | 26 4 | 12 52 | 9 | 25 49 | 12 57 |
| 10 | 27 2 | 12 32 | 10 | 26 47 | 12 37 |
| 11 | 28 0 | 12 12 | 11 | 27 45 | 12 17 |
| 12 | 28 58 | 11 52 | 12 | 28 43 | 11 57 |
| 13 | 29 56 | 11 31 | 13 | 29 41 | 11 36 |
| 14 | ♍ 54 | 11 11 | 14 | ♍ 39 | 11 16 |
| 15 | 1 52 | 10 49 | 15 | 1 37 | 10 55 |
| 16 | 2 50 | 10 29 | 16 | 2 35 | 10 35 |
| 17 | 3 48 | 10 8 | 17 | 3 33 | 10 14 |
| 18 | 4 46 | 9 47 | 18 | 4 31 | 9 53 |
| 19 | 5 44 | 9 26 | 19 | 5 29 | 9 31 |
| 20 | 6 42 | 9 4 | 20 | 6 27 | 9 10 |
| 21 | 7 40 | 8 42 | 21 | 7 25 | 8 49 |
| 22 | 8 38 | 8 21 | 22 | 8 23 | 8 27 |
| 23 | 9 37 | 7 59 | 23 | 9 22 | 8 5 |
| 24 | 10 35 | 7 37 | 24 | 10 20 | 7 43 |
| 25 | 11 33 | 7 15 | 25 | 11 18 | 7 21 |
| 26 | 12 31 | 6 53 | 26 | 12 16 | 6 59 |
| 27 | 13 30 | 6 30 | 27 | 13 15 | 6 36 |
| 28 | 14 28 | 6 7 | 28 | 14 13 | 6 14 |
| 29 | 15 26 | 5 45 | 29 | 15 12 | 5 51 |
| 30 | 16 25 | 5 22 | 30 | 16 10 | 5 28 |
| 31 | 17 23 | 5 0 | 31 | 17 8 | 5 6 |

North Declination.

33

Perseus right side of the second bigneſſe, Declination 48. degrees 22. minu. nozth. right aſcen, 2. ho. 56. minut.

34

Fomahand is a ſtarre of the firſt bignes, hauing ſouth Declination 33. deg. 15. min. and right aſcen. 22. houres. 40. minutes.

35

In the knee of Sagitarius is a ſtarre of the ſecond bignes hauing ſouth Declination, 42. deg. & right aſcention 18. houres 44. minutes.

Starres neare about the north Pole, with their diſtance from the ſaid Pole.

1

The Pole ſtarre is of the third bignes, whoſe diſtance from the Pole is 2. deg. 52. m & his right aſcen. is 50. min.

2

The foremoſt Guard of ꝑ ſecõd bignes, diſtant from ꝑ Pole 14. deg. 11. min. right aſcention 14. hou. 54, minut.

3

The hindermoſt Guarde, of the ſecond bignes, diſtant 16. degrees 42. minutes right aſcention 15. houres 26. minutes.

## September hath 30. daies.

| The Prime. | | | | Leng of the day. | Declination and true place. ☉ in my Leape yeare | | | | ☉ in my First yere | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | H.M. | D. | M. | D. | M. | | D. | M. | D. M. |
| | 1 | F | Giles. | 12 48 | 1 | 18 51 | 4 | 25 | 1 | 18 | 36 | 4 30 |
| x.8 | 2 | G | | 12 44 | 2 | 19 49 | 4 | 2 | 2 | 19 | 35 | 4 8 |
| | 3 | A | | 12 40 | 3 | 20 48 | 3 | 40 | 3 | 20 | 33 | 3 45 |
| xviii. 1. | 4 | B | | 12 36 | 4 | 21 46 | 3 | 16 | 4 | 21 | 32 | 3 22 |
| vii. 7. | 5 | C | dog d.e | 12 32 | 5 | 22 45 | 2 | 53 | 5 | 22 | 30 | 2 59 |
| | 6 | D | | 12 28 | 6 | 23 44 | 2 | 29 | 6 | 23 | 29 | 2 35 |
| 9. xv. | 7 | E | Nat. El. | 12 24 | 7 | 24 42 | 2 | 7 | 7 | 24 | 28 | 2 12 |
| iiii. 9. | 8 | F | Na. Ma. | 12 20 | 8 | 25 41 | 1 | 42 | 8 | 25 | 26 | 1 49 |
| | 9 | G | | 12 16 | 9 | 26 40 | 1 | 20 | 9 | 26 | 25 | 1 25 |
| xii. 2. | 10 | A | | 12 12 | 10 | 27 39 | 0 | 57 | 10 | 27 | 24 | 1 2 |
| | 11 | B | | 12 8 | 11 | 28 38 | 0 | 33 | 11 | 28 | 23 | 0 39 |
| i. 11. | 12 | C | | 12 4 | 12 | 29 36 | 0 | 9 | 12 | 29 | 22 | 0 15 |
| | 13 | D | | 12 0 | 13 | 0♎ 35 | 0 | 14 | 13 | 0♎ | 21 | 0 8 |
| ix xvii. 8 | 14 | E | Hol. cr. | 11 56 | 14 | 1 34 | 0 | 38 | 14 | 1 | 19 | 0 32 |
| | 15 | F | | 11 52 | 15 | 2 33 | 1 | 1 | 15 | 2 | 18 | 0 55 |
| 8. vi. | 16 | G | | 11 48 | 16 | 3 32 | 1 | 25 | 16 | 3 | 17 | 1 19 |
| xiiii. 2. | 17 | A | Lamb. | 11 44 | 17 | 4 31 | 1 | 47 | 17 | 4 | 16 | 1 42 |
| | 18 | B | | 11 40 | 18 | 5 30 | 2 | 12 | 18 | 5 | 15 | 2 6 |
| iii. 6. | 19 | C | | 11 36 | 19 | 6 30 | 2 | 35 | 19 | 6 | 14 | 2 29 |
| | 20 | D | Fast, | 11 32 | 20 | 7 29 | 2 | 59 | 20 | 7 | 13 | 2 52 |
| xi. 2. | 21 | E | Mathe. | 11 28 | 21 | 8 28 | 3 | 22 | 21 | 8 | 13 | 3 16 |
| | 22 | F | | 11 24 | 22 | 9 27 | 3 | 45 | 22 | 9 | 12 | 3 40 |
| xix. 1. | 23 | G | | 11 20 | 23 | 10 26 | 4 | 8 | 23 | 10 | 11 | 4 2 |
| viii. 9. | 24 | A | | 11 16 | 24 | 11 26 | 4 | 32 | 24 | 11 | 10 | 4 26 |
| | 25 | B | Cypriã. | 11 12 | 25 | 12 25 | 4 | 55 | 25 | 12 | 10 | 4 49 |
| 6. xvi. | 26 | C | | 11 8 | 26 | 13 24 | 5 | 18 | 26 | 13 | 9 | 5 13 |
| v. 5. | 27 | D | | 11 4 | 27 | 14 24 | 5 | 41 | 27 | 14 | 8 | 5 35 |
| | 28 | E | Fast. | 11 0 | 28 | 15 23 | 6 | 4 | 28 | 15 | 8 | 5 58 |
| 4 xiii. | 29 | F | S. Mich. | 10 56 | 29 | 16 23 | 6 | 27 | 29 | 16 | 7 | 6 22 |
| ii. 6. | 30 | G | Hierom | 10 52 | 30 | 17 22 | 6 | 50 | 30 | 17 | 7 | 6 45 |

North Declination. South Declination.

| September. | | | | | | | |
|---|---|---|---|---|---|---|---|
| of the Sunne. | | | | | | | |
| ☉ in ♍ second yere | | | | | ☉ ♍ third yere. | | |
| | D. M. | D. M. | | | D. M. | D. M. | |
| 1 | 18 21 | 4 37 | | 1 | 18 6 | 4 43 | |
| 2 | 19 20 | 4 14 | | 2 | 19 5 | 4 20 | |
| 3 | 20 18 | 3 51 | | 3 | 20 3 | 3 57 | |
| 4 | 21 17 | 3 28 | | 4 | 21 2 | 3 34 | |
| 5 | 22 15 | 3 5 | | 5 | 22 0 | 3 11 | |
| 6 | 23 14 | 2 42 | North Declination. | 6 | 22 59 | 2 47 | |
| 7 | 24 13 | 2 18 | | 7 | 23 58 | 2 23 | |
| 8 | 25 11 | 1 56 | | 8 | 24 56 | 2 1 | |
| 9 | 26 10 | 1 31 | | 9 | 25 55 | 1 37 | |
| 10 | 27 9 | 1 9 | | 10 | 26 54 | 1 14 | |
| 11 | 28 8 | 0 45 | | 11 | 27 53 | 0 51 | |
| 12 | 29 7 | 0 21 | | 12 | 28 52 | 0 27 | |
| 13 | ♎ 6 | 0 2 | | 13 | 29 51 | 0 4 | |
| 14 | 1 4 | 0 26 | | 14 | ♎ 49 | 0 19 | |
| 15 | 2 3 | 0 49 | | 15 | 1 48 | 0 43 | |
| 16 | 3 2 | 1 12 | | 16 | 2 47 | 1 7 | |
| 17 | 4 1 | 1 35 | | 17 | 3 46 | 1 30 | |
| 18 | 5 0 | 2 0 | | 18 | 4 45 | 1 53 | |
| 19 | 5 59 | 2 23 | South Declination. | 19 | 5 44 | 2 17 | |
| 20 | 6 59 | 2 47 | | 20 | 6 44 | 2 40 | |
| 21 | 7 58 | 3 11 | | 21 | 7 43 | 3 3 | |
| 22 | 8 57 | 3 34 | | 22 | 8 42 | 3 27 | |
| 23 | 9 56 | 3 56 | | 23 | 9 41 | 3 51 | |
| 24 | 10 55 | 4 20 | | 24 | 10 40 | 4 13 | |
| 25 | 11 55 | 4 43 | | 25 | 11 40 | 4 37 | |
| 26 | 12 54 | 5 7 | | 26 | 12 39 | 5 0 | |
| 27 | 13 53 | 5 29 | | 27 | 13 38 | 5 23 | |
| 28 | 14 53 | 5 52 | | 28 | 14 38 | 5 46 | |
| 29 | 15 52 | 6 15 | | 29 | 15 37 | 6 9 | |
| 30 | 16 52 | 6 39 | | 30 | 16 37 | 6 33 | |

4

The end of the Dragons taile of the third bignes, dist. from the Pole 18. deg. 26. minutes, right ascen. 11. houre 8. minutes.

5

The great Bears backe of the second bignes, distant from the Pole 26. deg. 5. minutes, right ascen. 10. houres 40. minutes

6

Cepheus right shoulder of the third bignes, distant 29. deg. right ascen. 21. houre 10 minutes.

7

The great Beares side of the second bignes, distant 31. de. 26. minut. right ascention 10. houres 38. minutes.

8

The first in her taile of the second bignes, distant 31. degrees 49. minutes right ascention 12 houres 32. minut.

## October hath 31. daies.

| The Prime | | | | Leng. of the day. | Declination and true place ☉ in ♎ Leape yere. | | | | ☉ in ♎ Fit yere | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | D. M. | | D. M. | | D. M | | M. D. |
| 8. ii. | 1 | A | | H. M. 10 48 | 1 | 18 22 | South Declination. | 7 13 | 1 | 18 6 | | 7 7 |
| x. 2. | 2 | B | | 10 44 | 2 | 19 21 | | 7 36 | 2 | 19 6 | | 7 30 |
| xviii. 10 | 3 | C | | 10 40 | 3 | 20 21 | | 7 58 | 3 | 20 5 | | 7 52 |
| | 4 | D | | 10 36 | 4 | 21 20 | | 8 20 | 4 | 21 5 | | 8 15 |
| 6. vii. | 5 | E | | 10 32 | 5 | 22 20 | | 8 42 | 5 | 22 5 | | 8 37 |
| xv. 2 | 6 | F | Faith. | 10 28 | 6 | 23 20 | | 9 5 | 6 | 23 4 | | 8 59 |
| | 7 | G | | 10 24 | 7 | 24 20 | | 9 27 | 7 | 24 4 | | 9 21 |
| iiii. 1. | 8 | A | | 10 20 | 8 | 25 19 | | 9 49 | 8 | 25 4 | | 9 43 |
| | 9 | B | Dennis | 10 16 | 9 | 26 19 | | 10 11 | 9 | 26 4 | | 10 5 |
| 4. xii. | 10 | C | | 10 12 | 10 | 27 19 | | 10 33 | 10 | 27 3 | | 10 27 |
| | 11 | D | | 10 8 | 11 | 28 19 | | 10 54 | 11 | 28 3 | | 10 48 |
| 9. i. | 12 | E | | 10 4 | 12 | 29 19 | | 11 16 | 12 | 29 3 | | 11 10 |
| ix. 10 | 13 | F | Edwar. | 10 0 | 13 | ♏ 19 | | 11 36 | 13 | ♏ 3 | | 11 31 |
| 7. xvii. | 14 | G | | 9 56 | 14 | 1 19 | | 11 57 | 14 | 1 3 | | 11 52 |
| vi. 3 | 15 | A | | 9 52 | 15 | 2 19 | | 12 18 | 15 | 2 3 | | 12 13 |
| | 16 | B | | 9 48 | 16 | 3 19 | | 12 39 | 16 | 3 3 | | 12 34 |
| 8. xiiii. | 17 | C | Fast. | 9 44 | 17 | 4 19 | | 12 59 | 17 | 4 3 | | 12 54 |
| | 18 | D | S. Luke. | 9 40 | 18 | 5 19 | | 13 19 | 18 | 5 3 | | 13 14 |
| 1. iii. | 19 | E | | 9 36 | 19 | 6 20 | | 13 39 | 19 | 6 3 | | 13 34 |
| | 20 | F | | 9 32 | 20 | 7 20 | | 14 0 | 20 | 7 4 | | 13 54 |
| 6. xi. | 21 | G | | 9 28 | 21 | 8 20 | | 14 20 | 21 | 8 4 | | 14 14 |
| xix. 11. | 22 | A | | 9 24 | 22 | 9 20 | | 14 39 | 22 | 9 4 | | 14 33 |
| | 23 | B | | 9 20 | 23 | 10 20 | | 14 58 | 23 | 10 4 | | 14 52 |
| 7. viii. | 24 | C | | 9 17 | 24 | 11 21 | | 15 17 | 24 | 11 4 | | 15 11 |
| xvi. 2. | 25 | D | Crispin | 9 14 | 25 | 12 21 | | 15 35 | 25 | 12 5 | | 15 29 |
| | 26 | E | | 9 10 | 26 | 13 21 | | 15 52 | 26 | 13 5 | | 15 48 |
| 4. v. | 27 | F | Fast. | 9 7 | 27 | 14 21 | | 16 12 | 27 | 14 5 | | 16 6 |
| | 28 | G | Simon | 9 4 | 28 | 15 22 | | 16 30 | 28 | 15 6 | | 16 25 |
| 11. xiii. | 29 | A | & Iude. | 9 0 | 29 | 16 22 | | 16 46 | 29 | 16 6 | | 16 49 |
| 2. ii. | 30 | B | | 8 56 | 30 | 17 23 | | 17 4 | 30 | 17 7 | | 16 55 |
| x. 11. | 31 | C | | 8 52 | 31 | 18 23 | | 17 21 | 31 | 18 7 | | 17 16 |

## October.

### of the Sunne.

| ☉ in ♎ second yere | | | ☉ in ♎ third yere | | |
|---|---|---|---|---|---|
| D, | M. | D, M, | D, | M | D, M, |
| 1 | 17 51 | 7 2 | 1 | 17 36 | 6 56 |
| 2 | 18 51 | 7 25 | 2 | 18 36 | 7 19 |
| 3 | 19 50 | 7 47 | 3 | 19 35 | 7 41 |
| 4 | 20 50 | 8 9 | 4 | 20 35 | 8 3 |
| 5 | 21 50 | 8 32 | 5 | 21 35 | 8 26 |
| 6 | 22 49 | 8 53 | 6 | 22 34 | 8 48 |
| 7 | 23 49 | 9 16 | 7 | 23 34 | 9 10 |
| 8 | 24 49 | 9 38 | 8 | 24 34 | 9 32 |
| 9 | 25 49 | 10 0 | 9 | 25 34 | 9 54 |
| 10 | 26 48 | 10 22 | 10 | 26 33 | 10 16 |
| 11 | 27 48 | 10 43 | 11 | 27 33 | 10 38 |
| 12 | 28 48 | 11 4 | 12 | 28 33 | 10 59 |
| 13 | 29 48 | 11 26 | 13 | 29 33 | 11 20 |
| 14 | m 48 | 11 47 | 14 | m 33 | 11 41 |
| 15 | 1 48 | 12 8 | 15 | 1 33 | 12 2 |
| 16 | 2 48 | 12 29 | 16 | 2 33 | 12 23 |
| 17 | 3 48 | 12 50 | 17 | 3 33 | 12 44 |
| 18 | 4 48 | 13 10 | 18 | 4 33 | 13 4 |
| 19 | 5 48 | 13 30 | 19 | 5 33 | 13 24 |
| 20 | 6 49 | 13 50 | 20 | 6 33 | 13 44 |
| 21 | 7 49 | 14 10 | 21 | 7 34 | 14 4 |
| 22 | 8 49 | 14 29 | 22 | 8 34 | 14 24 |
| 23 | 9 49 | 14 48 | 23 | 9 34 | 14 44 |
| 24 | 10 49 | 15 6 | 24 | 10 34 | 15 2 |
| 25 | 11 49 | 15 25 | 25 | 11 35 | 15 20 |
| 26 | 12 50 | 15 43 | 26 | 12 35 | 15 38 |
| 27 | 13 50 | 16 2 | 27 | 13 35 | 15 57 |
| 28 | 14 51 | 16 20 | 28 | 14 36 | 16 15 |
| 29 | 15 51 | 16 38 | 29 | 15 36 | 16 33 |
| 30 | 16 52 | 16 55 | 30 | 16 37 | 16 50 |
| 31 | 17 52 | 17 12 | 31 | 17 37 | 17 7 |

South Declination.

At the knees of Cassiopeia, is a starre of the third bignes, distant from the Pole 31. degrees 50. minutes right ascention 1. houre.

10

In her hippe is a starre of the third bignes, distant 31. degrees 26. minutes, right ascention 32. minutes.

11

The backe of her chaire of the third bignes, distant 33. degrees 2. minutes, right ascention 23. houres 48. minutes.

12

The great Beares thigh of the second bignes, distant from the Pole, 34. degrees 3. minutes right ascention 11 houres 32. minutes.

Nouem-

| The Prime. | | | | Leng of the day. | Declination and true place. ☉ in ♏ Leape yeare | | | | | South Declination. | ☉ in ♏ First yere | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | H,M. | D,M. | | D. M | | | | D.M. | | D.M. | |
| | 1 | | All Sain | 8 49 | 1 | 19 | 22 | 17 | 37 | | 1 | 19 | 7 | 17 33 |
| 5. xviii. | 2 | | | 8 46 | 2 | 20 | 23 | 17 | 53 | | 2 | 20 | 7 | 17 49 |
| vii. 3. | 3 | | | 8 43 | 3 | 21 | 23 | 18 | 9 | | 3 | 21 | 8 | 18 5 |
| | 4 | G | | 8 40 | 4 | 22 | 24 | 18 | 25 | | 4 | 22 | 8 | 18 21 |
| II. xv. | 5 | A | K. pref. | 8 37 | 5 | 23 | 25 | 18 | 40 | | 5 | 23 | 9 | 18 36 |
| | 6 | B | Leonar. | 8 34 | 6 | 24 | 25 | 18 | 55 | | 6 | 24 | 10 | 18 51 |
| 5 iiii. | 7 | | | 8 31 | 7 | 25 | 26 | 19 | 10 | | 7 | 25 | 10 | 19 6 |
| | 8 | | | 8 29 | 8 | 26 | 27 | 19 | 24 | | 8 | 26 | 11 | 19 20 |
| II. xii. | 9 | E | | 8 25 | 9 | 27 | 27 | 19 | 38 | | 9 | 27 | 12 | 19 35 |
| i. I2. | 10 | F | | 8 22 | 10 | 28 | 28 | 19 | 52 | | 10 | 28 | 12 | 19 49 |
| 4. ixxvii | 11 | G | S. Marti | 8 19 | 11 | 29 | 29 | 20 | 5 | | 11 | 29 | 13 | 20 2 |
| | 12 | A | | 8 16 | 12 | ✝ | 30 | 20 | 18 | | 12 | ✝ | 14 | 20 15 |
| | 13 | B | | 8 13 | 13 | 1 | 31 | 20 | 31 | | 13 | 1 | 15 | 20 28 |
| 8. vi. | 14 | | | 8 10 | 14 | 2 | 32 | 20 | 43 | | 14 | 2 | 16 | 20 40 |
| xiiii. 8. | 15 | D | | 8 7 | 15 | 3 | 33 | 20 | 55 | | 15 | 3 | 17 | 20 52 |
| | 16 | | | 8 4 | 16 | 4 | 33 | 21 | 6 | | 16 | 4 | 17 | 21 3 |
| | 17 | | | 8 2 | 17 | 5 | 34 | 21 | 17 | | 17 | 5 | 18 | 21 14 |
| 5. iii. | 18 | G | | 8 0 | 18 | 6 | 35 | 21 | 28 | | 18 | 6 | 19 | 21 25 |
| x. i. 9. | 19 | A | | 7 57 | 19 | 7 | 36 | 21 | 38 | | 19 | 7 | 20 | 21 35 |
| | 20 | B | Edmon. | 7 54 | 20 | 8 | 37 | 21 | 48 | | 20 | 8 | 21 | 21 45 |
| 4. xix. | 21 | C | | 7 51 | 21 | 9 | 38 | 21 | 57 | | 21 | 9 | 22 | 21 54 |
| viii. 5. | 22 | D | Cicily. | 7 49 | 22 | 10 | 39 | 22 | 6 | | 22 | 10 | 23 | 22 3 |
| | 23 | E | Clemẽ | 7 47 | 23 | 11 | 40 | 22 | 14 | | 23 | 11 | 24 | 22 12 |
| II. xvi. | 24 | F | | 7 45 | 24 | 12 | 41 | 22 | 22 | | 24 | 12 | 25 | 22 20 |
| | 25 | G | Kather. | 7 43 | 25 | 13 | 42 | 22 | 30 | | 25 | 13 | 26 | 22 28 |
| 10. v. | 26 | A | | 7 40 | 26 | 14 | 44 | 22 | 37 | | 26 | 14 | 27 | 22 35 |
| xiii. 8. | 27 | B | | 7 38 | 27 | 15 | 45 | 22 | 44 | | 27 | 15 | 29 | 22 42 |
| | 28 | C | | 7 37 | 28 | 16 | 46 | 22 | 51 | | 28 | 16 | 30 | 22 49 |
| ii. I2. | 29 | D | Fast. | 7 36 | 29 | 17 | 47 | 22 | 57 | | 29 | 17 | 31 | 22 55 |
| 2. x. | 30 | E | Andre. | 7 35 | 30 | 18 | 47 | 23 | 2 | | 30 | 18 | 32 | 23 0 |

of the Sunne.

| ☉ in ♏ second yere | | | | South Declination. | ☉ in ♏ third yeare | | | |
|---|---|---|---|---|---|---|---|---|
| D | M. | D. | M. | | D. | M. | D. | M. |
| 1 | 18 | 52 | 17 | 29 | 1 | 18 | 37 | 17 24 |
| 2 | 19 | 52 | 17 | 45 | 2 | 19 | 37 | 17 41 |
| 3 | 20 | 53 | 18 | 1 | 3 | 20 | 38 | 17 57 |
| 4 | 21 | 53 | 18 | 17 | 4 | 21 | 38 | 18 13 |
| 5 | 22 | 54 | 18 | 33 | 5 | 22 | 39 | 18 29 |
| 6 | 23 | 54 | 18 | 47 | 6 | 23 | 39 | 18 44 |
| 7 | 24 | 55 | 19 | 2 | 7 | 24 | 40 | 18 59 |
| 8 | 25 | 56 | 19 | 17 | 8 | 25 | 41 | 19 14 |
| 9 | 26 | 57 | 19 | 31 | 9 | 26 | 42 | 19 28 |
| 10 | 27 | 57 | 19 | 45 | 10 | 27 | 42 | 19 42 |
| 11 | 28 | 57 | 19 | 59 | 11 | 28 | 43 | 19 56 |
| 12 | 29 | 59 | 20 | 13 | 12 | 29 | 44 | 20 9 |
| 13 | 1 | 0 | 20 | 25 | 13 | 0 | 45 | 20 22 |
| 14 | 2 | 1 | 20 | 37 | 14 | 1 | 46 | 20 34 |
| 15 | 3 | 2 | 20 | 49 | 15 | 2 | 47 | 20 46 |
| 16 | 4 | 3 | 21 | 0 | 16 | 3 | 48 | 20 58 |
| 17 | 5 | 3 | 21 | 11 | 17 | 4 | 48 | 21 9 |
| 18 | 6 | 4 | 21 | 22 | 18 | 5 | 49 | 21 20 |
| 19 | 7 | 5 | 21 | 33 | 19 | 6 | 50 | 21 30 |
| 20 | 8 | 6 | 21 | 43 | 20 | 7 | 51 | 21 40 |
| 21 | 9 | 7 | 21 | 52 | 21 | 8 | 52 | 21 50 |
| 22 | 10 | 8 | 22 | 1 | 22 | 9 | 53 | 21 59 |
| 23 | 11 | 9 | 22 | 10 | 23 | 10 | 54 | 22 8 |
| 24 | 12 | 10 | 22 | 18 | 24 | 11 | 55 | 22 17 |
| 25 | 13 | 11 | 22 | 26 | 25 | 12 | 56 | 22 25 |
| 26 | 14 | 12 | 22 | 33 | 26 | 13 | 57 | 22 32 |
| 27 | 15 | 14 | 22 | 40 | 27 | 14 | 59 | 22 39 |
| 28 | 16 | 15 | 22 | 47 | 28 | 16 | 0 | 22 46 |
| 29 | 17 | 16 | 22 | 53 | 29 | 17 | 1 | 22 52 |
| 30 | 18 | 17 | 22 | 58 | 30 | 18 | 2 | 22 57 |

## Certaine Starres neere vnto the South Pole, with their distance from the said Pole, and right ascention.

1

The southermost starre in the south triangle, is a starre of the third bignes, distant from the south Pole. 11. degrees 30. minutes right ascention 9. houres.

2

The southermost of the Crosiers, is a Starre of the second bignes, distant 17. degrees 30. minutes right ascention 12. minutes.

3

In the Northwest angle of the south triangle, is a Starre of the second bignes, distant from the Pole, 27. degrees 25. minutes right ascention 8 houres 4. minutes.

December

## December hath 31. daies

| The Prime | | | | Leng. of the day. | Declination and ♈ua place. ☉ in ♐ Leapeyere | | | ☉ in ♐ First yeare. | | South Declination |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | H. M. | D. M. | D. M | | D. M. | D. M. | |
| xviii. 5 | 1 | F | | 7 34 | 1 19 48 | 23 6 | | 1 19 33 | 23 5 | |
| | 2 | G | | 7 33 | 2 20 49 | 23 10 | | 2 20 34 | 23 9 | |
| 9. vii. | 3 | A | | 7 32 | 3 21 51 | 23 15 | | 3 21 35 | 23 14 | |
| xv. 4. | 4 | B | | 7 31 | 4 22 52 | 23 19 | | 4 22 37 | 23 17 | |
| | 5 | C | | 7 30 | 5 23 53 | 23 22 | | 5 23 38 | 23 21 | |
| | 6 | D | | 7 30 | 6 24 54 | 23 24 | | 6 24 39 | 23 23 | |
| 10. iiii. | 7 | E | | 7 30 | 7 25 55 | 23 26 | | 7 25 40 | 23 25 | |
| xii. 7. | 8 | F | Con. M | 7 30 | 8 26 57 | 23 28 | | 8 26 41 | 23 27 | |
| | 9 | G | | 7 30 | 9 27 58 | 23 29 | | 9 27 43 | 23 29 | |
| ii. | 10 | A | | 7 30 | 10 28 59 | 23 30 | | 10 28 44 | 23 30 | |
| ix. 7. | 11 | B | | 7 30 | 11 ♑ 0 | 23 30 | | 11 29 45 | 23 30 | |
| 7. xvii. | 12 | C | | 7 30 | 12 1 1 | 23 30 | | 12 ♑ 46 | 23 30 | |
| vi. 9. | 13 | D | Lucy. | 7 30 | 13 2 2 | 23 29 | | 13 1 47 | 23 29 | |
| | 14 | E | | 7 31 | 14 3 4 | 23 28 | | 14 2 49 | 23 28 | |
| xiiii. 3. | 15 | F | | 7 32 | 15 4 5 | 23 26 | | 15 3 50 | 23 26 | |
| | 16 | G | | 7 33 | 16 5 6 | 23 24 | | 16 4 51 | 23 24 | |
| iii. 11 | 17 | A | | 7 34 | 17 6 7 | 23 22 | | 17 5 52 | 23 22 | |
| | 18 | B | | 7 35 | 18 7 8 | 23 19 | | 18 6 54 | 23 19 | |
| xi. | 19 | C | | 7 36 | 19 8 10 | 23 15 | | 19 7 55 | 23 15 | |
| xix. 8. | 20 | D | Fast | 7 37 | 20 9 11 | 23 11 | | 20 8 56 | 23 11 | |
| 9. viii. | 21 | E | S. Tho. | 7 38 | 21 10 13 | 23 6 | | 21 9 57 | 23 7 | |
| xvi. 2 | 22 | F | | 7 39 | 22 11 14 | 23 2 | | 22 10 58 | 23 2 | |
| | 23 | G | | 7 4' | 23 12 15 | 22 56 | | 23 11 59 | 22 57 | |
| | 24 | A | | 7 41 | 24 13 16 | 22 50 | | 24 13 1 | 22 52 | |
| v. 9. | 25 | B | Christ. | 7 42 | 25 14 18 | 22 44 | | 25 14 2 | 22 46 | |
| | 26 | C | S. Step. | 7 43 | 26 15 .0 | 22 37 | | 26 15 4 | 22 39 | |
| xiii. 3. | 27 | D | S. Iohn | 7 44 | 27 16 20 | 22 30 | | 27 16 5 | 22 32 | |
| ii. 1. | 28 | E | Innoce. | 7 46 | 28 17 21 | 22 23 | | 28 17 6 | 22 24 | |
| x. 9. | 29 | F | | 7 48 | 29 18 22 | 22 14 | | 29 18 7 | 22 16 | |
| | 30 | G | | 7 49 | 30 19 24 | 22 6 | | 30 19 8 | 22 8 | |
| | 31 | A | | 7 50 | 31 20 25 | 21 57 | | 31 20 10 | 21 59 | |

| December. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| of the Sunne. | | | | | | | | | |
| ☉ in ♐ second yere. | | | | | | ☉ in ♐ third yeare. | | | |
| | D. | M. | D. | M. | | | D. | M. | D. | M. |
| 1 | 19 | 18 | 23 | 4 | South Declination. | 1 | 19 | 2 | 23 | 3 |
| 2 | 20 | 19 | 23 | 8 | | 2 | 20 | 3 | 23 | 7 |
| 3 | 21 | 20 | 23 | 13 | | 3 | 21 | 4 | 23 | 12 |
| 4 | 22 | 2[illegible] | 23 | 16 | | 4 | 22 | 6 | 23 | 15 |
| 5 | 23 | 22 | 23 | 20 | | 5 | 23 | 7 | 23 | 19 |
| 6 | 24 | 23 | 23 | 23 | | 6 | 24 | 8 | 23 | 22 |
| 7 | 25 | 24 | 23 | 25 | | 7 | 25 | 9 | 23 | 24 |
| 8 | 26 | 26 | 23 | 27 | | 8 | 26 | 10 | 23 | 26 |
| 9 | 27 | 27 | 23 | 29 | | 9 | 27 | 12 | 23 | 28 |
| 10 | 28 | 29 | 23 | 30 | | 10 | 28 | 13 | 23 | 29 |
| 11 | 29 | 30 | 23 | 30 | | 11 | 29 | 14 | 23 | 30 |
| 12 | ♑ | 31 | 23 | 30 | | 12 | ♑ | 15 | 23 | 30 |
| 13 | 1 | 32 | 23 | 30 | | 13 | 1 | 16 | 23 | 30 |
| 14 | 2 | 34 | 23 | 29 | | 14 | 2 | 18 | 23 | 29 |
| 15 | 3 | 35 | 23 | 27 | | 15 | 3 | 19 | 23 | 28 |
| 16 | 4 | 36 | 23 | 25 | | 16 | 4 | 20 | 23 | 26 |
| 17 | 5 | 37 | 23 | 23 | | 17 | 5 | 21 | 23 | 24 |
| 18 | 6 | 39 | 23 | 20 | | 18 | 6 | 23 | 23 | 21 |
| 19 | 7 | 40 | 23 | 17 | | 19 | 7 | 24 | 23 | 18 |
| 20 | 8 | 41 | 23 | 13 | | 20 | 8 | 25 | 23 | 14 |
| 21 | 9 | 42 | 23 | 9 | | 21 | 9 | 26 | 23 | 10 |
| 22 | 10 | 44 | 23 | 4 | | 22 | 10 | 28 | 23 | 5 |
| 23 | 11 | 45 | 22 | 59 | | 23 | 11 | 29 | 23 | 0 |
| 24 | 12 | 46 | 22 | 53 | | 24 | 12 | 30 | 22 | 54 |
| 25 | 13 | 47 | 22 | 48 | | 25 | 13 | 31 | 22 | 49 |
| 26 | 14 | 49 | 22 | 41 | | 26 | 14 | 33 | 22 | 43 |
| 27 | 15 | 50 | 22 | 33 | | 27 | 15 | 34 | 22 | 35 |
| 28 | 16 | 51 | 22 | 26 | | 28 | 16 | 35 | 22 | 28 |
| 29 | 17 | 52 | 22 | 19 | | 29 | 17 | 36 | 22 | 21 |
| 30 | 18 | 53 | 22 | 10 | | 30 | 18 | 37 | 22 | 12 |
| 31 | 19 | 55 | 22 | 1 | | 31 | 19 | 39 | 22 | 4 |



The forefoode of the Centaur of the second bignes, distant 29. degrees 54. minutes, right ascention 14. houres 44. minutes.

5

Centaurs thigh of the second bignes, distant 40. degrees 30. minutes, right ascention 11. houres 52. minutes.

6

Canopus in argo nauis of the first bignes, dist. from the south Pole 38. degrees 10. minutes, right ascention 6. houres 60. minutes.

7

The last of Eridanus of the first bignes, distant 50 degrees right ascention 3. houres.

How to vse these Starres, for the time of their being vpon the Meridian, and consequently to finde the height of the Pole or latitude by them, followes afterward.

This Table

| | ♈ ♎ | | ♉ ♍ | | ♊ ♐ | |
|---|---|---|---|---|---|---|
| | D. | M. | D. | M. | D. | M. |
| 0 | 0 | 0 | 11 | 30 | 20 | 12 | 30 |
| 1 | 0 | 24 | 11 | 51 | 20 | 25 | 29 |
| 2 | 0 | 48 | 12 | 12 | 20 | 37 | 28 |
| 3 | 1 | 12 | 12 | 33 | 20 | 49 | 27 |
| 4 | 1 | 35 | 12 | 53 | 21 | 0 | 26 |
| 5 | 2 | 0 | 13 | 13 | 21 | 11 | 25 |
| 6 | 2 | 23 | 13 | 33 | 21 | 22 | 24 |
| 7 | 2 | 47 | 13 | 53 | 21 | 33 | 23 |
| 8 | 3 | 11 | 14 | 13 | 21 | 42 | 22 |
| 9 | 3 | 35 | 14 | 32 | 21 | 51 | 21 |
| 10 | 3 | 58 | 14 | 51 | 22 | 0 | 20 |
| 11 | 4 | 22 | 15 | 10 | 22 | 9 | 19 |
| 12 | 4 | 45 | 15 | 28 | 22 | 17 | 18 |
| 13 | 5 | 9 | 15 | 47 | 22 | 25 | 17 |
| 14 | 5 | 32 | 16 | 5 | 22 | 32 | 16 |
| 15 | 5 | 55 | 16 | 23 | 22 | 39 | 15 |
| 16 | 6 | 19 | 16 | 40 | 22 | 46 | 14 |
| 17 | 6 | 42 | 16 | 57 | 22 | 52 | 13 |
| 18 | 7 | 5 | 17 | 14 | 22 | 57 | 12 |
| 19 | 7 | 28 | 17 | 31 | 23 | 3 | 11 |
| 20 | 7 | 50 | 17 | 47 | 23 | 7 | 10 |
| 21 | 8 | 13 | 18 | 3 | 23 | 12 | 9 |
| 22 | 8 | 35 | 18 | 19 | 23 | 15 | 8 |
| 23 | 8 | 58 | 18 | 34 | 23 | 19 | 7 |
| 24 | 9 | 20 | 18 | 49 | 23 | 22 | 6 |
| 25 | 9 | 42 | 19 | 4 | 23 | 24 | 5 |
| 26 | 10 | 4 | 19 | 18 | 23 | 26 | 4 |
| 27 | 10 | 26 | 19 | 32 | 23 | 28 | 3 |
| 28 | 10 | 47 | 19 | 46 | 23 | 29 | 2 |
| 29 | 11 | 9 | 19 | 59 | 23 | 30 | 1 |
| 30 | 11 | 30 | 20 | 12 | 23 | 30 | 0 |
| | ♍ ♓ | | ♎ ♒ | | ♏ ♑ | |

This Table sheweth the Declination of the Sun vpon euery seuerall degree of ỹ Eclipticke, through all the foure quarters of the Zodiacke: by which Table you may make triall of the former Table of Declination, if you doubt of any part thereof, as followeth.

First by the Kalender or Ephemerides next before, finde out the day of the month, for which you desire the Declination, & right against the same you shall haue the signe, degree & minute, which the Sun possesseth in the Zodiacke the day aforesaid, with which signe and degree, enter this Table and marke whether your signe be at the head of the Table, or at the foote thereof: for if the signe bee in the head, then you must count the degree thereof downeward, in the first Columne at the left hand of the Table: but if the signe be at the foote of the Table, you must count the degree thereof vpward, in the first Colume on the right hand: and in the common angle, where the Characters of the signe and the deg. thereof mætes, is the deg. & min. of declination desired.

Example.

The 5. of July 1612. the place of the Sunne is 23. deg. of Can. I finde Canc. in the foot of the Table, therefore counting 23. degrees thereof vpward

ward in the first Columne on the right hand, right against 23. in the columne where Canc. stands, is 21. degrees 32. min. which is the declination of 23. degrees of Canc. or of the Sunne, being in so many degrées of the same signe. But if the place of the sunne haue odde minutes therewith, you must take the difference betwixt the 2 neerest degrees of declination, and worke by the proportionall partes of 60. minutes to a degrée, as for example. The 22, of August 1613. the true place of the Sun is 8. degr. 52. min. of Virgo, I finde Virgo to bee in the foote of this Table, therefore in the first columne on the right hand, I count vpwards 8. degr. and right against the same in the columne where the charact of Virgo is, I finde 8. degrées 35. minutes which is the Declination of 8. degrées of Virgo, but now there is the Declination of 52. minutes to bee either added or deducted, as the Declination doth increase or decrease. To finde which, I take the difference betwixt 8. degrées 35. minutes, the Declination of 8. degrées of Virgo and 8 13. minutes, the declination of 9. degrées of Virgo, which is 22. minutes. Then I say, if 60. minu. giue 22. minutes, what giues 52, min. facit, 19. min 4. seconds : but omitting the seconds, because the declination doth decrease, I deduct 19. min. from 8. 35. min. and the remainer is 8. 16. minutes for the true declination of 8. degrées 52. minutes of Virgo.

Againe, the 16. of Aprill, 1614. the true place of the Sun is 5. 54. minutes of Taurus, I finde Taurus in the head of the Table, then counting 5. degrees downeward in the first columne on the left hand, right against the same vnder Taurus is 13. 13. minu. for the declination of 5. degrées of Taurus then for the 54. minuts, I take the difference betwixt 13. 13. minutes, and 13. 33. min. the declination of 6. degrées of Taurus: which is 20. mi. then if 60. giue 20. what giues 54. facit 18. min. which 18. min. I adde to 13. 13. minutes, because the Declination doth increase, and it makes 13. 31. minutes for the true Declination of 5. 54. minutes of Taurus. These three examples (to the ingenious) are as good as fiue hundreth.

The

## The diuision, partes, order, and explanation of the former Almanacke or Ephemerides.

THe first Page of the said Ephemerides containes an Almanacke for 24. yeares to come, shewing the Prime, Epacte, Sunday letter, Leape yeare, with all the principall moouable Feastes in the whole yere. Nert followes the 12. monthes of the yeare in order, each month containing two faces, which 2. faces may be diuided into 3. principall sections: the first common, the second and third Astronomicall: the first being indede the common, because it is most nedfull for all persons, consisteth of fiue Columnes or spaces: the first space whereof sheweth the day and houre of the Moones change for 19. yeares to come: the second sheweth the number of the daies in euery month: the third, the Letters ordinarie for euery day of the weeke: the fourth, the holydaies and other daies of note in each month. Where note, that those that are obserued for holie dayes, haue this word Fast, before them, and the fift and the last of the said first section, sheweth the length of the day in houres and min. where the Pole is elevated 51. degrees 40. minutes.

The second section containeth 4 principal parts, each part consisting of 3. Columnes, the 4. partes being 4. seuerall yeares, each first yeare being Leape yeare, therein comprising the variety of the Suns Course through the Zodiacke in the said 4. yeares. And the 3. spaces or Columnes in each yere, the first is the daies of each month in the said yeare, the second the true place of the Sun answerable thereto, the third, the Declination or distance of the Sun from the Equin. pointes of Aries and Libra toward the tropicall points of Cancer and Capricorne answearable to each day of the month, and to the degree and minutes of the Sunne in the Zodiacke.

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The reason wherefore the said Table is made for 4. yeares & neither more nor lesse, is because that euery yeare is not of like equalitie of daies one with another: for the first yere hath 365. da. & ianére 6. houres: the second and third yeares being so likewise, but in the fourth yere, the odde houres are united together, which being 4. times 6. is 24. houres verie neare, making a natural day, which day is added to the said fourth yeare, whereby the said fourth yeare is called leape yeare, because it hath one day more then his fellowes.

And so this Table being made for 4. yeares, would serue for a long time, were it not that the said fourth yeare is not iust 365. daies but wants 20. mi. or $\frac{1}{3}$ of an houre, for if there were a iust equalitie made of the dayes of the yeares, with the progresse of the sunne through the Zodiacke, then this table would serue a long time without correction: but only the Zodiacke, with the whole eyght sphere hath a certaine retrograde motion or going backward, yet so vnsensible, that these Tables being gathered and calculated out of ỹ best & truest Ephemer. for the yeres 1613. 1614. 1615. 1616. according to the true place & dayly motion of the sun there exactly gathered, I make no question, but that they will verie well serue for 20. yeares at the least, the difference of the Suns place euery 5. yeare is so small being not much aboue 30. seconds or halfe a minute, which in 20. yeares being 5. Bissextels or leape yeares, makes 2. min. 30. seconds: a small matter to make any difference in the Suns declination.

Notwithstanding which small error that can growe in so long a time, I thinke it not amisse for the satisfying of those ingenious spirits, which desire perfection in their worke, to adde this one rule for their farther satisfaction, that after these 4. yeares are past, for which the said former Tables are exactly and truely calculated, to knowe precisely the true place of the Sunne, for any other 4. yeares afterward, doe thus: subtract the 1616 from the date of the yeare in which you would knowe the true place of the Sunne, the remainer wherof diuided by 4. that which remaines vpon the said diuision, sheweth which of the 4. yeares in the former Kalender serueth to shewe the Suns place for the

yeare

yeare proposed, and if nothing remaine after the Diuision, then the last of the yeres being the fourth in number, is your yeare desired: which knowne, to make an equation of the Sunnes true place, marke how many Vnities are in your quotient, for so many min. must be added to the Suns place in the said yere formerly found for euery day in the monthes of May, June, July, August, September, and October, and halfe of so many minutes in the other monthes.

As for Example.

I would knowe the true place of the Sunne the 15. of August. in the yeare 1624. first I substract 1616. from 1624. and there restes 8. which deuided by 4. bringes 2. in the quotient, and 0. remaines, which 0. shewes that the first of the 4. yeares, answeres to the yeare desired, and beeing that there is 2. in the quotient, therefore I must adde 2. minutes to the place of the Sunne, which is belonging to the day and yere aforesaide, which being that to the 15. of August in the first of the yeares, belongs 2. degrees 21. minutes of Virgo, I adde two minutes thereto, and the whole 2. 23. minutes is the true place of the Sunne for the day and the yeare aforesaid, whose declination answerable thereto, you shall finde right against the same in the nert columne towards the right hand, to bee 10. degrees 39. minutes.

Againe, the 15 of March, in the yeare 1625. I desire the true place of the Sunne, therefore substracting 1616. from 1625. rests 9. which deuided by foure, the quotient is 2. and the remainer is 1, which remainer being 1. I must seeke for the Sunnes place in the second of the 4. years, whose place there I finde for the 15. of March, to be 4. degrees 51. minutes of Aries: to which, because the quotient is 2. I adde halfe so many minutes, which being 1. minute, makes 4. degrees 52. minutes, for the Sunnes true place, the 15. of March 1625: whose declination answerable thereto, you shall finde right against the same in the nert columne towards the right hand, to be 1. degree 57. minutes northerly: Wherein thus much is to be noted, that albeit, that in the true place of the Sunne there may bee in

that

that time so much difference, yet in the Declination thereof there can be no sensible difference, for we see, that 3. minutes more or lesse in the true place of the Sunne, doth not produce above a minute difference of Declination, when the Sunnes Declination is swiftest, which is neare vnto the Equinoctiall point, and being neare vnto the Tropicks, when the Declination doth increase or decrease very slowly three or foure minutes difference in the Sunnes true place, doth not make any difference in the Declination at all: And therefore by that reason may you be well assured, that these Tables being exactly calculated for the yeares aforesaid, will serue you for a very long time without any sensible error.

The third section being the last of the second face, containeth the names, Magnitudes, and Declinations of 54. notable fixed Starres, with their right ascention in houres and minutes, most commodious to finde the eleuation of the Pole, whose vse followeth afterward.

## Propositions to be wrought by the Ephemerides or Sea-mans Kalender, as followeth.

### To know the Moones change.

1 TO know the day and houre of Cõiunction or change of the Moone, first looke in the first Page of this Ephemerides, right against the yeare of our Lord, for the Prime number, serving to that yeare: which number keeping in memory, turne to the month in which you desire the Change of the Moone, and in the first columne of the said Month vnder the Title Prime, looke for the Prime number which you kept in memorie, which Prime numbers are there all in numerall Letters, and right against the saide Prime number in the next Collume, is the number of the day of the month on which the Moone changes: and if

there be any figure with the Prime number, marke whether it be before or after the said Prime number, for if it be before, it sheweth the Moone to change so many houres before noone: if after, it sheweth so many houres after noone: but if there be no figures at all with the Prime number, then the Moone changes iust at noone.

As for Example.

In the yeare 1614. I would know in June vpon what day and houre of the said Month the Moone chãges. In the first Page being an Almanacke of 24. yeares for ẏ Prime, Epact, Dominicall Letter and moueable Feastes, I finde the Prime for that yeare to be 19. which kæping in memorie, I turne to June, and in the first colume therof vnder the title Prime, amõg the numerall Letters I sæke for 19. which I finde right against the 27. day of the month, thus 11.19. w̃ the figure of 11. before it, which sheweth that in June 1614. the Moone chãges the 27. day, 11. houres before noone, which is at one a clocke in the morning.

Againe, in Septẽber the same yere, the Prime 19. vnder ẏ title Prime in the month of Sept. I finde the Prime aforesaid right against the 23. day of the month, with the figure 1. after it, & further against it in the third colume, among the Letters for the daies of the wæke, is the Letter G. which by reason that B. is the Dominicall Letter or Sunday letter for that yere, G. stands for Friday: so then I conclude, that in September 1614. the moone shall change the 23. day being Friday 1. houre after noone.

Of the full and quarters of the Moone.

2. The next thing to be considered herein, is the first quarter, the full Moone, and the last quarter thereof, which is thus done: to the time of her change adde 7. daies and 6. houres, sheweth the first quarter, that doubled sheweth the opposition or full: and thereto againe the said 7. daies, 6. houres added, makes the time of the last quarter.

To

To know what signe the Moone is in.

3. A third thing needfull to be knowne, is in what signe the Moone is at all times, which may thus be done: vpon the change day next before your day required, looke in the second section of the Ephe. vnder the yeare desired, and the Colume of the place of the Sun for the day and yeare, what signe and degree thereof the Sunne was in vpon the said day of the Coniunction, for then were the Sunne and Moone both in one signe and degree: and to know what signe she is in any day after, multiply her age by 12. which is the meane motion of the Moone: and from the day of the Coniunction, in the colume of the true place of the Sunne, tell forward, if the number be so great, out of that month to the next, till you haue tolde the number of the product of the Moones age, multiplied by 12. and where the said product number ends, is the signe and degree of the Moone.

Example.

The 8. of October 1616. I desire the same: in which month by the first proposition, I finde the Moone to change the first day at 4. a clocke in the morning: then in the last part of the second section shewing the true place and Declination of the Sun for the said yeare, in the first colume thereof I seeke the said first day of the month, & right against it in ỳ next colume is 18. 22. mi. of Libra, in which signe & deg. both the Sun and the Moone were at the coniunction: then counting from the change to the 8. day is 7. daies for the Moones age, that multiply by 12. is 84. which counting from the day of the coniunction along in the colume of the Sunnes place, endes vpon the 24. day of the month of December, against which day is 13. degrees 16. minutes of Capricorne: therefore I conclude the Moone to be in Capricornus the day, month and yeare aforesaid: otherwise if you multiply the Moones age by 2. and deuide the product by 5. the quotient shewes the whole signe, and the remainer so many times 6. degrees as the Moone is gone from that place of the Zodiacke where she was in the coniunction.

## The Moones comming to the Meridian, with the time of her rising and setting.

4. Multiplie the Mones age by 12. and deuide the product by 15. the quotiēt sheweth the houre of the Mons being south, and if any thing remaine after the diuision, for euery vnitie that remaines adde 4. min. because 15. degrees make an houre of time, & 4. min. a degree. That knowne, learne by the third proposition what signe the Mone is in, and then loke out in the second sectiō what time and day of the yeare the Sunne possesseth the same signe and degree thereof, and right against the said day in the last Columne of the first section, vnder the title length of the day, is the length of the day, the sunne being in the same signe in houres and minut. halfe that number of the daies length taken from the time of the mones being south, sheweth her rising, and the said halfe added to the time of her being south, sheweth her setting.

### Example.

The 31. of October 1614. by the first proposition, I finde the Mone to change that month, the 22. day after none, & the number of daies betwixt that and the 31. aforesaide is 9. for ỹ mones age: therefore multiplying 9. (her age) by 12. her meane motion, the product is 108. which diuided by 15. (the degrees answering to an houre) the quotient is 3. houres, and 3. remaines, which is so many times 4. min: so I cōclude the mone to be vpon the Meridian the day aforesaid, at 3. of the clocke and 12. mi. Thē by the third proposition, I find the mons to be that day in about 12. degrees of Aquarius, the Sunne being in which place, is aboue the Horizon 8. houres & 46. minutes: which is likewise the time of the Mones continuance aboue the Horizon at that time, or at any time being of like age, and in the same Signe: therefore taking halfe 8. houres 46. which is 4. houres 23. minutes from 7. a clocke 36. minutes, the time of the Mones being South, there rests 3. houres 13. minutes for the time of her rising. Likewise adding foure houres 23. minutes, to seauen houres thirtie fiue minutes, maketh 11. houres 59. minutes

after

afternoone, for the time of her setting. Thus you see that the day and yeare aforesaide, the Moone shall here in our Horizon, rise at 3. a clocke 13. minutes after noone: shee shall be South, or vpon the Meridian, at 7. a clocke 36. minutes after noone: she shall set at 11. a clocke 9. minutes at night: and her continuance aboue the Horizon, or her shining to vs, is 8. 46. houres.

This is a very necessary thing to be knowne, for by her being vpon any other point of the Compas, you may giue a very neare gesse, at euery houre of the night.

The next thing to be considered in the first section, is the Festiuall dayes, and other daies of note, which are so common, that they neede no explanation. Onely this: before euery feast which is kept Holiday, is set this word Fast.

## To know the length of the Day, or the length of the Night, with the rising and setting of the Sunne.

5. All this is performed by the last Colume of the first section, thus: Right against the day of the month desired in the last Colume of the saide first section, vnder the Title length of the day, is the length of the day desired, in houres and minuts: which number substracted from 24. the length of a naturall Day, leaues the length of the Night: and halfe the said number taken from noone, leaues the houre of the Sunnes rising: the other halfe of the day added to noone, sheweth the Sunnes setting.

Example.

The 19. of October this present yeare 1614. vnder the title len. of the day, right against the said 20. day, is 9. houres 36. minuts, the length of the day: which 9. houres 36. minuts taken from 24. houres, leaues 14. houres, 24. minuts for the length of the night. Then the half of 9. houres 36. minuts, which is 4. houres 48. mi. taken from noone, leaues 7. houres 12. minutes for the Sunne rising. The same 4. houres 48. minutes added to noone, makes 16. houres 48. minuts, which is 4. hours 48. minuts after noone: By which you see that the 20. of October, the length of the day, is 9. houres 36. min. the length of the night 14. houres 24. minuts: the Sunne riseth 12. min. after 7. in the morning, and setteth 48.

minutes after 4. in the Euening.

Thus much for the first section: the 2. section being foure parts, seruing for foure seuerall yeares, euery part hauing 3. Columes: the first the day of the month, the 2. the true place of the Sunne, and the 3. the declination of the Sun agreeing thereto, all ỹ three parts being of like qualitie, which are so plaine and so commonly knowne, that they neede no further distinction, albeit that the vses thereof are manifold, & commodities excellent: For there are few propositions cõcerning the Spheare, which can be wrought without the true place of the Sunne knowne, and being so much vse for it, there are as few meanes for the true knowledge thereof, but onely by the Ephemerides, which euery one cannot haue.

And for that cause I haue transferred the true place of the Sunne in degr: & minu: out of the best Ephemerid: into this former Kalender, where it is ready for such as desire the same, or as haue occasion to vse the same, in working conclusions, or making of Instruments Mathematicall: but most chiefely I haue heere placed it, to the ende that those that stand in doubt of the truth of these Tables of the Sunnes declination, may at their owne pleasure make tryall thereof: The order how to doe the same is set downe in the first printed page, after the saide Tables, for by the true place of the Sunne, is found his Declination, eyther North or South: and by his Declination, & obseruation of the Sunnes Altitude vpon the Meridian, is knowne the height of the Pole or Latitude of the place where you are.

## How to vse the Sunnes Declination, thereby to finde out the Eleuation of the Pole.

5. To find out the Altitude or height of the Poles, in any seuerall Latitude, viz. How much the Pole is raised aboue your Horizon in degrees and minutes, It is necessarie first to take by obseruation, the Meridian Altitude of the Sunne: which meridian altitude is knowne, by taking the height of the Sunne, that day, in which you would obserue iust at noone: at which time the Sunne is highest, being then also vppon the Meridian: which found,

found, note it downe in paper or slate: Then knowing the yeare of our Lord, with the month in which you are, and also the day of the month, looke in the Kalender before spoken of, for the month and day thereof, and right against the said day of the month, toward the right hand, vnder the Title Declination of the Sunne, you shall see the seuerall yeares, which the saide Tables of Declination serue for. If it be Leape yeare, looke in the first of the said foure Tables, vnder the Title, Leap yeare: If it be the first yeare after the Leape yeare, then resort to the second of the said Tables, vnder the Title first, and so of the second & third, and after those foure yeares are past, come backe againe to the first, and proceede as you did before: Then (as I said) hauing found out the month, day, and yeare, direct your eye downeward toward the foote of the Table, in that Table which serues to the yeare proposed, till you finde a number making a right angle, with the day of your moneth: or more plainely; Looke what number in the last Colume of your yeare, is right against the day of your month: which nũbers are the declination for the day desired: and being two numbers in the said Colume, the first are degrees, the other min: then regard also, whether the Sun hath north declination or south declination, which is set downe betweene the seuerall spaces: where by the way you shall note, that frõ the Sunnes entrance into Aries, which is the 11. of March, till his entrance into Lib: the 13. of Septẽb: he hath north Declination: and from the saide 13. of septẽber till his entrance into Aries againe, south Declination: the said declination increasing according to the sunnes progresse through the signes, from his entrance into Aries, till his entrance into Cancer: and decreasing frõ Canc. to the beginning of Libra. Then againe increasing from Libra to Capricorne, and decreasing frõ Cap: to the ende of Pisces, and beginning of Aries. Aries, Taurus, Gemini, Cancer, Leo, and Virgo, being Signes hauing north declination frõ the Equinoctiall Circle: and Libra, Scorp: Sagittarius, Capricornus, Aquarius, and Pisces, south signes, hauing south declination frõ the said Circle: Then knowing (as I haue said) the Meridian Altitude of the sunne, the declination of the sunne, and whether the sunne hath north or south declina: as

these three things are alwayes to be considered, in knowing the height of the pole. If the Declination be north, substract the declination from the Meridian Altitude, the remainer is the elevation of the intersection, or cutting of the Equinoctial with the meridian aboue the Horizon, which in common termes is the elevation of the Equinoctiall aboue the Horizon: which height of the Equinoctiall, taken from 90. leaueth the height of the pole, or the Latitude of the place of your obseruation. But contrariwise, if the Sunne hath south declination, adde the said declination to the meridian Altitude, the product is the height of the Equinoctiall, which likewise taken from 90. leaueth also the height of the pole.

Example.

I obserued the 11. of Julie 1612. in the Cittie of London, and found the meridian Altitude of the Sunne to be 58. degrees 48. minuts, and the declination of the Sunne north 20. degrees, 28. minutes: Being that the Declination was north, I substracted 20. degrees, 28. minut: the Declination of the Sunne from 58. degrees 48. minutes, the height of the Sunne at none: the remainer was 38. degrees 20. minutes, the height of the Equinoctiall: that taken from 90. leaues 51. degrees, 40. minut: for the height of the pole, or Latitude of London.

This rule is to be vnderstood, when you are betweene the Equinoctiall and the North pole, and the Sunne to the southward of you: but if you should be betweene the Equinoctiall and the south pole, and the Sunne north from you, then you must worke contrary: For then, if the Sunne hath south Declination, you must substract the Declination from the meridian Altitude, and if the Sunne hath north Declination, you must adde the saide Declination to the meridian Altitude.

For Example.

Being at Sea to the southwards of the Line, the fourth of Januarie, 1612. suppose that you obserue the height of the Sunne at none, and find it to be 66. degrees, 20. minutes, then you shall finde the declination to be 21. degrees 25. minutes to the southwards, which substracted from 66. degrees 20. minutes, the Meridian

ridian Altitude, leaues 44. degrees 55. minutes, for the height of the Equinoctiall: that taken from 90 rests 45. degrees 5. minutes, for the height of the South pole aboue the Horizon.

Againe, suppose that being at Sea, the 10. of May 1612. and obseruing the Sunne, you take his Altitude at noone 60. degrees 30. minuts, and his declination then is 20. degrees 6. min: northward, but then not hauing obserued long before, you know not whether you are to the northward of the Equinoctiall, or to the southward of the saide Line: to know which, set the Sunne by your Compas, & marke which way the shadow of the Sunne striketh; For if he casteth his shadow the same way that his Declination is, then is the sunne betwixt the Equinoctiall and you. Your selfe being also the same way that the sunnes Declination is: and therefore substracting the Declination 20. degrees 6. min: from 60. degrees 30. minu: the Meridian Altitude rests 40. degr. 24. min. the height of the Equinoctiall: the complement whereof 49. degrees 36. min. is the eleuation of the North pole: but if the Sunne castes his shadow contrarie to his Declination, that is to say; If hauing north Declination, his shadow goeth southward, or hauing south declination, casts his shadow northward: Then eyther the Equinoctiall shall be betwixt you and the Sun, or you in the Equinoctiall; or else you shalbe betwixt the Equinoctiall and the Sunne: which to knowe, adde the Declination and the Meridian Altitude for the day proposed together, If the summe of the addition be lesse thē 90. degrees, so much as it wanteth of 90. degrees, shall you be distant frō the Equinoctiall, that way which the shadowe striketh: If it be iust 90. degrees, then are you vnder the Equinoctiall. Againe, If your sayd Meridian Altitude & Declination added, passeth 90. degrees, then so much as is ouer-plus, shall you be from the Equinoctiall towards the Sunne, and then also you shall be betwixt the Equinoctiall and the Sunne, and if you finde the Sunne to be in your Zenith, so much as is the Declination shall you bee from the Equinoctiall, that way that the sunne declineth: By which reason, if the Sun be in your Zenith, that is, 90. degrees high, and hath no Declination, then are you vnder the Equinoctiall.

How

## How to appropriate the Tables of Declination to any other Meridian.

There is in the vsing of the Sunnes declination, one principall thing to be considered: which is; That a Table of Declination made for any particular place, doth not serue generally for all places, but onely for such places as haue the like, or nære the same Longitude: The reason is, because that the Declination is Calculated according to the true place of the Sun at noone; at which time the sunne is vppon the Meridian of that place for which the said Tables are made: But you must note that the Sunne doth not come to the Meridian in all places at a like Time, although that in all places the sunne being vpon the Meridian, makes the middle of that day. But for euery 15. degræ difference of Longitude betwæne any two places, the sunne comes sonet or later to the Meridian by so many houres: For if the place be 15. degræs to the eastward of the place prefixed, then the sunne comes sonet to the Meridian by one houre, and if it be 15. degræs to the westward, later by an houre. And so consequently more or lesse, according to the difference of Longitude. By which reason, in what part of the world soeuer you be, you may worke for the Declination of the sunne in that place, by the proportionall partes of 24. houres Declination, to the houre of difference in Longitude.

As for Example.

Being in Brasilia (a part of the west Indies) the [illegible]. of April, this yeare 1612. whose meridian is distant frõ the Meridian of England, to the westward about 45. degr. which is 3. houres of time, that the sunne should come to the Meridian, later there then here at Lond: where the Table is made; For whẽ it is 12. a clock here, it is but 9. there, & being noone there, it is . a clocke here. Therefore to applie this Table to that place, I find the Declination for the day aforesaid, vnder our Meridian to be 11. degræs 43. min. at noone, & by reason that when it is 12. a clocke at Brasilia, it is then at Lond: 3. houres past. Therfore by the rule of proportion, I sæke what declination the Sun hath at 3. a clocke after noone, as followeth. I take the differẽce of declination betwæne the day afore-

afozesaid, and the nert following, which is 20. min: then I say by the rule of 3. if 24. hours giue 20. minutes, what giues 3. hours, the time of the difference of Longitude? facit 2. minu: and 30. seconds, which (because the Declination increases) I adde to the number of the day proposed: so I conclude the declination of the sunne to be the 10. of Aprill at nœne, in the Kingdom of Brasilia, 11. degrees 45. minutes, omitting the seconds.

Againe, the day and time afozesaid, in the Bay of S. Sebastian, whose Longitude is 58. degrees to the Eastward of London, answering to nere 4. houres of time, shewing that the sunne comes soner to the Meridian in the Bay of S. Sebastian, by 4. houres, then at London: by which reason the Declination is lesse there, then at London, because the Declination doth increase: For if the declination did decrease, it would be more there then at London: and to knowe the Declination of the Sunne in the Bay afozesaid, I take the difference betwixt the Declination of the 10. of April, and the declination of the day nert before, being 20. min: Then (I say) if 24. hours giues 20. min. what 4. hours? facit 3. minutes: which deducted from 11. degrees 43. minu: the Declination of the sunne the 10. of Aprill afozesaid at London, leaueth 11. degrees 40. minuts: The Declination of the sunne, at nœne, in the Bay of S. Sebastian, beeing that when it is 12 of the clocke there, it is but 8. a clocke at London: or in any place hauing the same Longitude.

## How to obserue the height of the Pole by the Starres.

THe working hereof by the starres, to find the height of the Pole, is all alike with the working therof by the sunne: for if you obserue any starre vpon the Meridian, looke in ỳ third or last section of the Ephemerides, amongst the monthes for the name of the starre which you obserued, wherewith you shall find his declination either north or south, & the right ascention thereof in houres and minuts: and hauing taken the Altitude of any starre vpon the Meridian, you haue nothing to marke in the table for this, but the Declination, which if it be north, take the declination

clination of the ſtarre from the height thereof: The remainer taken from 90. leaueth the height of the pole: but if the ſtarre hath ſouth Declination, adde the declination with the altitude taken, and the product thereof taken from 90. leaues the height of the Pole: alſo to finde the time of any ſtarres comming to the Meridian, is ſet downe after the Table of the ſunnes right aſcention.

Example.

The 25. of November 1609. I obſerued a ſtarre of the ſecond bignelle in the ſhoulder of Pegaſus, or the Flying-Horſe, about 8. of the clocke in the Euening, and found the Meridian Altitude thereof to be 51. degrees 18. minutes: and in the Kalender, in the ſecond Face thereof, I find the ſaid ſtarre to haue 12. degrees 58. min. north Declination: which taken from 51. degrees, 18. minutes, the height obſerued, leaues 58. degrees 20. min. the height of the Equinoctiall: The complement whereof 51. degrees 40. minutes, is the height of the North Pole at London.

And ſo conſequently for all thoſe Starres, whoſe Declination is taken from the Equinoctiall: but for thoſe ſtarres which are any thing neere to the Pole, whoſe diſtance or Declination is counted from the Pole, their working is thus: You muſt note, that being any thing farre to the Northward, ſome of theſe ſtarres will be twiſe vpon the Meridian, viz. once aboue the Pole, and once vnder the Pole: Therefore if you obſerue any ſtarre vpon the Meridian vnder the pole, adde the diſtance of the ſaide ſtarre from the pole to your Altitude obſerued, the totall is the height of the pole: But if you obſerue any ſtarre vpon the Meridian aboue the pole, ſo much is the diſtance or Declination of the ſaid ſtarre from the pole, you muſt take from the Altitude taken, the remainder is the height of the Pole.

As for Example.

If at London you obſerue the former Guard Starre beneath the Pole vpon the Meridian, you ſhall finde it to be 37. degrees, 29. minutes, to which if you adde 14. degrees 11. minutes, the diſtance of the ſaid ſtarre from the Pole, the totall is 51. degr. 40. min. the height of the north Pole at London. Againe, the ſame ſtarre obſerued vpon the Meridian about the Pole is 65. degrees 55. minutes, from which 14. degrees 11. minutes, the diſtance afore ſaid taken, leaueth 51. degrees 40. minutes as before.

Note that being farre northward, thoſe ſtarres betweene the Equinoctial and the Tropicke of Cancer, are beſt to obſerue, and being betweene the ſaid Tropick and the Equinoctiall, thoſe ſtars about the Pole are fitteſt for obſeruation, & for thoſe that trauell farre beyond the line to the Southwards: the like order muſt be kept by the ſtarres, betweene the Equinoctiall and the Tropicke of Capricornus, and thoſe that are neere the ſouth Pole.

And whereas the north ſtarre it ſelfe being very neere vnto the Pole, is the fitteſt ſtarre for to be obſerued, by reaſon of the neerenelle thereto, I haue for your further eaſe, made an exact Table for the declination of the north Starres from the Diameter of the Poles Circle, deſcribed by the North ſtarre, which may be alſo, or rather called the eleuation or depreſſion vpon euery point of the Compaſſe, being very commodious, by reaſon whereas the other Stars are onely to be obſerued vpon the Meridian. This ſaid north ſtarre by the helpe of this Table following, may be obſerued at any time of the night, whoſe vſe followeth after the ſaid Table.

Here

| | Pointes of the Compasse. | | Degre. | Minuts. | Of Declination. |
|---|---|---|---|---|---|
| | N:W:b:W | | 0 | 0 | |
| | Nor west | | 0 | 34 | |
| | N:w:b:N: | | 1 | 6 | |
| If the | N:N;W: | Then | 1 | 36 | |
| guards | N:by W | he | 2 | 4 | Vnder |
| be | North. | Load | 2 | 24 | the pole |
| | N:by E | tarre | 2 | 40 | |
| | N:N:E | s. | 2 | 50 | |
| | N:E:by N | | 2 | 52 | |
| | North East | | 2 | 50 | |
| | N.E.by E | | 2 | 40 | |
| | E.N E | | 2 | 24 | |
| | E.by N | | 2 | 4 | |
| | East. | | 1 | 37 | |
| | E.by S | | 1 | 6 | |
| | E.S.E | | 0 | 34 | |
| | S.E.by E. | | 0 | 0 | |
| | South East | | 0 | 34 | |
| | S.E.by S | | 1 | 6 | |
| If the | S.S.E | Then | 1 | 36 | |
| guards | S.by E | he | 2 | 4 | Aboue |
| be. | South. | Load | 2 | 24 | the pole |
| | S.by W | Starre | 2 | 40 | |
| | S.S.W | s. | 2 | 50 | |
| | S.W.by S | | 2 | 52 | |
| | S.W | | 2 | 50 | |
| | S.W.by W | | 2 | 40 | |
| | W.S.W | | 2 | 24 | |
| | W.by S | | 2 | 4 | |
| | West. | | 1 | 36 | |
| | W.by N | | 1 | 6 | |
| | W.N.W. | | 0 | 34 | |

Here foloweth an exact table to knowe how much the North *Starre is, either aboue* or beneath the Pole, the Guards being vpon any point of the Compasse.

The vse of which table is thus: hauing obserued ỹ Altitude of ỹ north starre, marke so nere as you may, vpõ what point of ỹ compasse the Guards then are: which knowne, resort to this Table, & finding therein ỹ said point vpon which the Guardes were at your obseruation, right against the same is the number of deg. & minutes, which ỹ starre is either aboue or beneath the Pole, which nũber so found, if it be aboue ỹ Pole must be substracted from your Altitude taken, and if vnder the pole, it must be added to ỹ said Altitude takẽ: which total added, or remaine substracted, is the true height of ỹ pole it selfe.

As

As for example.

Obſeruing the north Starre to be 58. degrees 30. minutes, when the Guards are at the north east, I looke in the Table for the northeaſt point of the cõpaſſe, and right againſt the ſame I finde 2. degrees 50. minutes vnder the pole, which being that the north ſtarre is vnder the Pole, I adde his declination .degr. 50. min. to 58. degr. 30. minutes, his altitude obſerued, and the total 61. degrees 20. minutes, is the iuſt height of the Pole it ſelfe in that place.

Againe, obſeruing the north ſtarre to be 5 .degrees 15. minutes aboue the Horizon, when the Guards are vpon the Southeaſt point of the Cõpaſſe, I looke for ſoutheaſt in the Table, and right againſt the ſame is 34. minuts aboue the Pole, which being that the Starre is then ſo much higher then the pole it ſelf, I ſubſtract 34. minutes, the declination of the ſtarre frõ 50. degrees. 15. min. the Altitude taken, and the remainer 49. degrees, 41. minutes is the perfit height of the Pole aboue the Horizon in the ſaid place of obſeruation.

And now hauing made plaine vnto you, ỹ vſe and profit of the ſaid table, it being indeed as neceſſary and commodious for the Mariners vſe, as any rule whatſoeuer, it reſteth now to ſpeake ſomewhat more particularly of the other fixed Starres, ſet down in the former Kalender, or Ephemerides, whoſe vſe is manifold and very excellent, but their vſe for the finding of the Poles elevation by their Declination, obſerued at their being vpon the Meridian, being formerly ſhewed, it is now onely requiſit to explaine vnto you, a briefe and eaſie methode for the exact & ready finding of the true time of any of the ſaid fixed ſtarres coming to the Meridian, at which time they are onely fit for to be obſerued: for the knowledge whereof, I haue here placed a table of the right aſcention of the Sunne for euery day of each month throughout the whole yeare, according to his true place for euery of the ſaid dayes, formerly ſet downe in the Kalender or Ephemerides: the vſe whereof followeth after the ſaid Table.

A Table

# A Table of the Sunnes

| Daies. | Ianua. H. M. | Febru. H. M. | Marc. H. M. | Aprill. H. M. | May. H. M. | Iune. H. M. |
|---|---|---|---|---|---|---|
| 1 | 19.30. | 21.39. | 23.25. | 1 16 | 3 11 | 5 15 |
| 2 | 34 | 43 | 28 | 22 | 15 | 19 |
| 3 | 39 | 47 | 32 | 26 | 19 | 23 |
| 4 | 43 | 50 | 36 | 29 | 23 | 27 |
| 5 | 47 | 54 | 40 | 33 | 27 | 31 |
| 6 | 52 | 58 | 44 | 36 | 30 | 36 |
| 7 | 56 | 22 2 | 47 | 40 | 34 | 40 |
| 8 | 20. 0 | 6 | 51 | 43 | 38 | 45 |
| 9 | 4 | 9 | 55 | 47 | 42 | 49 |
| 10 | 8 | 14 | 58 | 51 | 46 | 53 |
| 11 | 13 | 18 | 0 2 | 55 | 50 | 57 |
| 12 | 17 | 21 | 6 | 58 | 54 | 6 1 |
| 13 | 22 | 25 | 9 | 2 2 | 58 | 5 |
| 14 | 26 | 29 | 12 | 6 | 4 2 | 9 |
| 15 | 30 | 32 | 16 | 10 | 7 | 13 |
| 16 | 34 | 36 | 20 | 14 | 11 | 18 |
| 17 | 38 | 40 | 23 | 18 | 15 | 22 |
| 18 | 42 | 44 | 27 | 22 | 19 | 26 |
| 19 | 46 | 48 | 31 | 26 | 23 | 30 |
| 20 | 50 | 52 | 35 | 30 | 27 | 34 |
| 21 | 54 | 56 | 38 | 33 | 31 | 38 |
| 22 | 58 | 59 | 42 | 37 | 35 | 42 |
| 23 | 21 3 | 23 3 | 46 | 41 | 39 | 46 |
| 24 | 7 | 7 | 49 | 44 | 43 | 51 |
| 25 | 11 | 10 | 53 | 48 | 47 | 55 |
| 26 | 15 | 14 | 57 | 52 | 51 | 59 |
| 27 | 19 | 18 | 1 0 | 56 | 56 | 7 3 |
| 28 | 23 | 22 | 1 3 | 3 0 | 5 0 | 7 |
| 29 | 27 | | 1 7 | 4 | 3 | 11 |
| 30 | 31 | | 1 11 | 7 | 7 | 15 |
| 31 | 35 | | 1 15 | | 11 | |

*right ascention in Houres and Minutes.*

| Daies. | Iulie. H. M. | Augu. H. M. | Septē: H. M. | Octo. H. M. | Nouē. H. M. | Decēb H. M. |
|---|---|---|---|---|---|---|
| 1 | 7. 19. | 9 22. | 11 16 | 13 5 | 15 5 | 17 12 |
| 2 | 23 | 26 | 20 | 8 | 9 | 17 |
| 3 | 27 | 30 | 23 | 12 | 13 | 21 |
| 4 | 31 | 33 | 27 | 16 | 17 | 25 |
| 5 | 35 | 36 | 30 | 19 | 21 | 30 |
| 6 | 40 | 40 | 33 | 23 | 25 | 34 |
| 7 | 44 | 44 | 37 | 27 | 29 | 39 |
| 8 | 48 | 48 | 41 | 31 | 33 | 43 |
| 9 | 52 | 52 | 44 | 4 | 37 | 47 |
| 10 | 56 | 56 | 48 | 38 | 42 | 52 |
| 11 | 8 0 | 59 | 52 | 42 | 46 | 56 |
| 12 | 4 | 10 3 | 55 | 45 | 50 | 18 0 |
| 13 | 8 | 7 | 59 | 9 | 54 | 5 |
| 14 | 12 | 11 | 12 3 | 53 | 58 | 10 |
| 15 | 16 | 15 | 7 | 57 | 16 3 | 14 |
| 16 | 20 | 18 | 11 | 14 1 | 7 | 18 |
| 17 | 24 | 22 | 14 | 5 | 11 | 23 |
| 18 | 28 | 26 | 18 | 9 | 16 | 27 |
| 19 | 31 | 29 | 22 | 13 | 20 | 32 |
| 20 | 35 | 33 | 25 | 17 | 24 | 36 |
| 21 | 39 | 36 | 29 | 20 | 28 | 41 |
| 22 | 43 | 40 | 32 | 24 | 33 | 45 |
| 23 | 47 | 44 | 36 | 28 | 37 | 50 |
| 24 | 51 | 47 | 40 | 32 | 41 | 55 |
| 25 | 55 | 51 | 43 | 36 | 46 | 59 |
| 26 | 59 | 54 | 47 | 40 | 50 | 19 3 |
| 27 | 9 3 | 58 | 51 | 44 | 55 | 7 |
| 28 | 7 | 11 2 | 54 | 48 | 59 | 12 |
| 29 | 11 | 6 | 58 | 53 | 17 3 | 16 |
| 30 | 15 | 9 | 13 2 | 57 | 8 | 21 |
| 31 | 19 | 13 | | 15 1 | | 8 25 |

## ¶ A Declaration of the *former Table.*

I Thinke it not amisse, before I shewe the vse of the former table of right ascention, for the finding of the time of any Starres comming to the Meridian, to Explane vnto you what wee call right ascention. Knowe therefore, that in the Spheare there is right ascention, oblique ascention, and meane ascention, which haue all seuerall definitions: but the rest being impertinent, I will onely speake of Right ascention, which is thus defined. Right ascention is that portion of the Equinoctiall which commeth to the Meridian, or mounted with any starre, or any part of the Ecliptick: or more plainly, It is that number of degrees of the Equinoctiall, comprised betwixt the Vernall equinoctiall point, or intersection of the said equinoctiall circle, and the first minute of Aries, and that starre or part of the Ecliptick, which is vpon the meridian at the day or time desired. As for your better vnderstanding, if the beginning of Aries be vpon the meridian, or any point or starre in the said beginning of Aries, then hath the saide point or starre so scituated, no right ascention at all, by reason that the beginning of the Equinoctiall commeth to the Meridian therewith: But if the beginning of Cancer, or any Starre in that scituation, bee vpon the meridian, then is there with it vnder the same meridian 90. degrees of the Equinoctiall, or 6. houres of time, being that euery 15. degrees of the Equinoctiall answeres to one houre of time, shewing that that starre or point, which is in the beginning of Aries, shall come to the Meridian 6. houres sooner then that o-

ther

ther which is in the beginning of Cancer, and so of others: I doubt not but that these fewe wordes will suffice to giue you the better light to that which followes. First therefore to finde the right ascention of the Sunne at any time: loke for the Monthe in the head of the Table, and for the day of the month at the left side of that face, where the Monthe desired is, and in the common Angle answering to them both, is the houre and minute of the Sunnes right ascention.

As for Example.

I desire the right ascention of the Sunne the 25. of May: first in the head of the Table I loke for May, which found in the first Columne on the left hand, I loke for 25. and right against the same in the cõmon angle, vnder the title May, I finde 4. houres and 47. mi: for the right ascẽtion of the Sun, the said 25. of May.

These things thus knowne and considered, it is to be noted, that whereas the Sunne hath a different number for his right ascention euery day, and the starres kẽp euery one still a like number for his peculiar right ascention, the reason thereof is this.

The Starres are all fixed in the eight Spheare, in which eight Spheare is also the Zodiacke placed, not only to limit the course and progresse of the Sunne in his continuall motion, but also to giue a certaine limitation to the Starres, who being fixed in anie parte of the Heauens, that certaine Meridian or Circle of south and north, which passeth through the Center of any starre, cutteth also in one place or other of the saide Zodiacke: which number of Degrées so cut in the Zodiacke, is the Longitude or distance of the said starre from the beginning of Aries: Now the starre (as I said) being so fixed hath no motion, but onely as the whole Frame of the Zodiacke with the eight Spheere, and all the Circles & Starres therin placed, which as is apparant to the sight, is by the First-mouer carryed round about from East to West in 24. houres: but the Naturall motion of the said eight Spheare, being from the West to the East, is so slowe, that it is vnsensible; whereas the Sunne being of a very swift motion in comparison of the former, his motion beeing euery 24. houres, neere vpon a Degrée little more or lesse, makes his motion from

the West to the East in the Zodiacke most apparant by his motion, also describing the Zodiacke Circle, as never declining frō the middle thereof: and further, the Sunne being the ruler of the Day and director of the Night, is the sole and onely distinguisher of Time: For this is apparant to the view of euery one, that the Sunne being vpon the Meridian aboue the Horizon, makes the middle of the day, and being vpon the Meridian vnder the Horizon, makes also the middle of the night: which being (as I haue said) that the sunne coms always to the Meridian iust at twelue a clocke; It followes necessarily, that what starre or point in the Zodiacke soener, hath greater Longitude then the Sunne, his right ascention is also greater then the sunnes: and loke how much the saide right ascention is more then the sunnes, by so much later then the sunne must the said starre or poynt come to the saide Meridian, proportionally after 15. degrees to an houre, and one degree to 4. minutes of time.

Take this therefore for a generall rule, that if the right ascention of the starre, whose time of comming to the Meridian you desire to know, be greater then the right ascention of the Sunne, substract the sunnes right ascention from the saide starres right ascention, and the remainer (if it be lesse then twelue) is the houre and minute that the starre comes to the Meridian after Noone: and if the remainer be more then twelue, substract twelue also: and the remainer shewes so many houres and minuts after mid-night: But if the Sunnes right ascention be greater then the starres right ascētion, then adde twentie foure houres to the starres right ascention, and substract the sunnes right ascention there from as before, the remainer shewes the starres comming to the Meridian after noone: If it be lesse then twelue, or if it be more then twelue: twelue also substracted, the remainer shewes so many houres and minutes after mid-night.

As for Example.

The 15. of November, I desire to knowe at what time Oculus Tauri, (or the Bulls eye) will be vpon the Meridian: first in the former Table of the sunnes right ascention, I loke for the

15. of

15. of November, where I finde the Sunnes right ascention to that day to be 16. houres and 3. minutes: and in the Kalender or Ephemerides amõg the fixed Starres, I finde the right ascention of ☿ Bulles eye to be 4. houres 13. minuts: which being lesse then the Suns right ascention, I adde 24. houres to 4. houres 13. minuts, and from the totall 28. houres 13. minuts: substracting 16. houres 3. minuts, the Sunnes right ascention, rests 12. houres 10. minuts, which being moze then 12. houres, I take away also 12. hours, and so there rests 10. mi. after midnight, that Oculus Tauri comes to the Meridian the saide 15. of November.

Againe, the tenth of Aprill, I would knowe at what time the Lyons taile will be vpon the meridian: in this Table I finde the Sunnes right ascention, the day aforesaide, to be 1. houre 51. minutes, and in the Kalender I finde the right ascention of the Lyons tayle to be 11. houres 29. minuts: Then substracting 1. houre 51. minutes, the Sunnes right ascention, from 11. hours, 29. min. the Starres right ascention, rests 9. houres 38. minuts, shewing that 38. minuts after 9. a clocke at night, the said starre shall be vpon the Meridian.

## *The Monthly time of each Starres being in rule for Obseruation.*

### Ianuarie.

Oculus Tauri, the whole constellation of Orion, Hircus the Goate, the great Dog, the little Dog, the greatest part of Leo, the Crosiers, Canopus, and the south Tryangle.

### Februarie.

The whole constellation of Leo, Arcturus, the Centaure, and the Virgins Spike.

### March.

The hinder part of Leo, Hydra, Virgins Spike, the Centaure, Arcturus, the Ballance, and Scorpio.

### Aprill.

The Centaure, Ballance, Sorpio, Lyra, and Sagittarius.

May.

Scorpio, Lyra, South Crowne, and Eagles heart.

Iune.

South Crowne, Eagles heart, Swans-taile, and the Dolphin.

Iulie.

The Dolphin, Fomahand, and Pegasus shoulder.

August.

Fomahand, Pegasus, Cassiopeia, Andromeda, the Whale, and the Ramme.

September.

Cassiopeia, Andromeda, the Whale, the Ramme, Medusa, Perseus, and Eridamus.

October.

All the former of September, and Oculus Tauri, Orion, Hyreus, and the great Dogge, the Crosiers, and Canopus.

Nouember.

All the former of October, with the little Dogge, and the South Tryangle.

December.

The Whale, the Ramme, Medusa, Perseus, Eridamus, Oculus Tauri, Hyrcus, Orion, Canopus, great Dogge, little Dogge, Hydra, and Leo, in the Monthes aforesaide, at one time or other of the Night, these starres are vpon the Meridian.

Hauing sufficiently Explaned vnto you the manner and way how both by the Sunne and starres to attaine to the true height of the Pole, or Lati: of any place; I purpose now God willing to speak somwhat of the Longitude: which as the former is most easie, and the finding therof knowne almost to all Sea-men, so is the other as vncertaine, and hath not yet hitherto bene found out or knowne eractly to any, albeit that many Learned men and of great Experience, haue laboured very earnestly for the same, and many good means haue they inuēted, as helps and assistance vnto Marriners in their long Nauigations and Trauells, by which, though w̄ great labour, care, and industry, they transport themselues

ſelues to the vtmoſt Regions of the woꝛld, with farre moꝛe eaſe and facilitie they might doe it, if they could as perfectly and readily finde the Longitude at all times, as they may the Latitude: foꝛ then hauing ſayled many dayes in vnknowne pathes vppon the large and ſpacious Seas, and induring all thoſe vnindurable troubles, miſeries, and vnſpeakable calamities, which do foꝛ the moſt part attend vpon Long-voyages: yet after all this, if vpon the firſt faire opoꝛtunity, they could readilie with the Latitude, finde alſo the Long: their foꝛe-paſſed troubles would be ioyfullie remedied, being that theſe two (like louing ſiſters) would applye much pleaſing comfoꝛt to their colde ſtomacks, after their tedious trauells, by giuing them the true pꝛick oꝛ place of their then pꝛeſent being. Peter Appian, and Gẽma Friſſius, hath wꝛitten theꝛof, as alſo ſome others: but truely in my opinion, it was neuer bꝛought to ſuch exquiſite perfection, as it is now a dayes; and foꝛ me to wꝛite theꝛof, were but as it were to ſet vp a candle at noone dayes, rather to ſhew mine owne follie, then to lighten thoſe that knowe a better way then my ſelfe: in which doing, well may Apelles ſaying, Ne ſutor vltra crepidam, be applyed vnto mee: But foꝛ my excuſe, I do intreat the iudicious to perſwade themſelues, that it is farre from my thought to ſet doꝛwne any thing in this foꝛ a pꝛeſident vnto them, but onely in good will to ſhew my opinion thereof, to the Ignoꝛant, being as followeth.

Firſt theꝛefoꝛe, the Latitude being knowne by finding the Longitude alſo, you haue the true pꝛicke oꝛ place in the Globe, oꝛ Carde, where your Shippe is, which to finde neareſt is two wayes, one by dead Reckoning, the other by Obſeruation: but dead Reckoning (as they call it) being as I take it moſt vſed, I will ſpeake firſt theꝛeof, by which if it were poſſible that this reckoning could exactly and pꝛeciſely bee kept, it would giue both Latitude and Longitude without any obſeruation at all; The different Latitude being onely the diſtance that the Shippe is departed from the Paralell where ſhe laſt was, eyther Noꝛthward oꝛ Southward: and Longitude being the diſtance that ſhee is departed from the Meridian, eyther Eaſtward oꝛ Weſtward: Foꝛ the knowledge whereof, theſe thinges are pꝛincipally

to be considered.

Firſt, the true pricke or place of the ships being at the beginning of the voyage.

Secondly, a sound and experimented iudgement of the way that the ship maketh, with euery swift winde.

Thirdly, to know exactly how much the Compasse doth varrie from the true North or South point, vpon which the Needle is toucht, either eastward or westward, in as many seuerall places as conueniently may be obserued.

Fourthly, to note diligently the flods or Currents, which may cause the ships way to be more Leward, or otherwise then expectation, and to giue allowãce of her course & way accordingly.

Fiftly, the seuerall points of the Compasse that she makes her course good vpon, & what way she hath made vpon euery point.

Sixtly, to bring those seuerall courses into one straight line, thereby to know what course she hath made good, with the nearest distance vpon the said point or Rombe, that she hath made her way good vpon.

And lastly, knowing how many leagues doth raise or lay a degrée vpon ẏ said Rombe, the true reckoning of your said course & distance, giues you the differẽce of Lati. or the paralel where the ship then is: & also knowing how many leagues answers to a degrée of east and west in the said paralell, the course, distance and Latitude giues the difference of Longitude or the Meridian, vnder which the ship then is: the intersection of which said paralell and Meridian, is the pricke or place of the ships then being, of which things I will speake more particularly afterward.

Now it resteth to speake something of knowing the longitude only by obseruation, which is very necessarie to be knowne, that thereby the one may make triall of the other, being that if the accompt by dead reckoning, and also by obseruation, do both agrée in the Lati. and Longitude, then may you be well assured, that you knowing truely the place where you then are, which longi. by obseruation is thus knowne: prepare a very perfect and true rũning glasse, which may precisely runne 24. houres without error, and about the time that you purpose to set saile, set the saide

glasse

glasse a running iust at twelue a clocke, when the Sunne is vpõ the Meridian: and being run out, be sure to turne the said glasse instãtly as it is out, not losing any time in the turning of it, and so hauing very warily kept the said Glasse till you thinke good to make an obseruation, at which time it is requisite to haue in readinesse a halfe houre-glasse, and a minute glasse, that if the 24 houre-glas be out before the sunne come to the meridian, then so soone as it is out, to turne the halfe houre-glasse or min. glasse, as you see occasion, thereby to know presently how much the 24. houre glasse is out before the Sunne comes to the Meridian: for if the Sunne is vpon the Meridian iust when the 24. houre-glasse is out, then you may assure your selfe that you haue sailed North or South, and are still vnder the same meridian that you were at the first: but if the twentie foure houre-glasse be out before the Sunne come to the Meridian, for euery foure minutes that the glasse is out before none, your difference of Longitude is one degrée to the westward, and for euery houre 15. degrées. And contrarie, if the Sun come to the Meridian before the glasse is out, thẽ according to the same proportiõ of time, is your difference of Longitude to the eastward, which difference of Longitude, if you multiply by the number of miles answerable to a degrée of Longitude in that Latitude where you then finde your selfe to be, the product giues the miles of distance, that you are either to the eastward or westward of the Meridian, that you departed from.

The like may also be effected by any of those fixed starrs, whose true time of comming to the Meridian you knowe: For if the accompt of time precisely kept by your glasse, and the starres comming to the meridian as you finde by your table of right ascentiõ doe iustly agrée, then are you still vnder one & the same meridian, but if the Time be past by your account, that the said Starre should be vpon the meridian before the Starre doth come to the meridian, for euery houre that the starre comes to the meridian after the said time past, your difference of Longitude is fiftéene degrées to the Westward, and for euery houre that the starre comes to the meridian before, by your accoũt of time truly kept,

it

it ſhuld be vpon the Meridian, your difference of Longitude is 15. degrees to the Eaſtward. Thus much ſhall ſuffice to haue ſpoken concerning my opinion for finding the Longitude at Sea by obſeruation, and now it reſts to ſpeake ſomewhat of ſome neceſſarie helpes, for the finding thereof by dead reckoning, as is before promiſed.

## Of the variation of the Compaſſe.

Concerning the Variation of the Compaſſe, it hath bene very learnedly treated of by diuers of our owne Country-men, and in our vulgar tõgue, and namely by Maiſter Norman and Maiſter Burrowes, in their Bookes called the New Attractiue, & variation of the Compaſſe: & ſince that, moſt excellẽtly & ingeniouſly written of by that rare and learned Mathematicia of our time, M. Wright, in his booke of the Correction of errors in Nauigation: as alſo in his Tranſlation called the Hauen-finding Arte: in which reſpect it is needleſſe for me heere to write any thing thereof, onely let it ſuffice to ſpeake a little thereof, as being neceſſary to the knowledge of ỹ foregoing matter, for them that would willingly note how much the Compas doth varie in ſeuerall places of their ſailing, I thinke it beſt to haue the Needles of their Compaſſes touched vppon a good ſtone, and ſo placed directly vnder the North point of the Flie, without allowing any Variation at all, the outer edge of the ſaid flye to be graduated each quarter into 90. degr. for the ready reckoning of the degrees that the Compaſſe doth varie frõ the true North or South, either toward the Eaſt or Weſt: ouer which flie, it is neceſſary to haue a round circle of braſſe, with two ſights vpõ the ſame, the one directly againſt the other, at oppoſite points to be raiſed perpendicularly where occaſion ſhall ſerue: which circle, with the ſights thereon, as I haue ſaid, being placed vpon the glaſſe, ouer the Flye, within the bore, where the compas is, when you would obſerue the variation of the compas iuſt, either at the ſunnes riſing or ſetting, turne the ſights in the braſſe circle towardes the Sunne, and looking through the ſame, marke preciſely how many degr: the Sun riſeth or ſetteth from the eaſt or weſt point of the Flye or Compas: For if the Sun be in the Equinoctiall, hauing then no amplitude, ſo much as is the difference of the Sunnes riſing or ſetting, from the eaſt or weſt

points,

points, shewed by the compas, is the Variation of the Compas, from the true north or south, but if the sun be either to the northward or southward of the Equinoctiall, hauing amplitude: then is there a respect also to be had to the Suns amplitude; as thus: If the Sun haue north or south amplitude, and that you obserue the sun to rise or set so much frō the east or west point of the Compas, as is the Suns amplitude, & likewise the same way that the amplitude is, then hath the Compas no variation: but if the sun hauing North amplitude, riseth notwithstanding more northerly by your Compas, then the said amplitude should be the degrees of true amplitude, deducted frō the amplitude, which the compasse sheweth, leaueth the variation of the compas to the Eastward of the North: but if the true amplitude be greater, then the compas sheweth the one deducted from the other, leaueth the variation to the westward of the north: and if the amplitude be southerly, and the compas shew the sun to rise northerly, both the differēces added together, giues the Variation easterly: or if the amplitude be northerly, and the compas shews it to be southerly, then both the differences added together, giues the variation westerly. All this is to be vnderstood, whē you obserue by the amplitude ortiue, viz. at the Suns rising: for if you obserue the setting thereof, then by adding or deducting the differences betwixt the true amplitude knowne, and the amplitude giuen by the compas, the totall or remaine shewes the compas to varie so much to the contrary side: an example will make all this plaine vnto you, which let be thus proposed. Suppose that being at Sea, you find by the Table of sines hereafter set down (or by some other means) the Suns amplitude at that time to be 20. deg: to the northward, & setting the sun at his rising by the cōpas (as is before shewed) you finde that the sun riseth 35. deg. to the northward of the east, which is somwhat to ỹ northw: of the northeast & by east point, therfore substracting 20. deg: the Suns true amplit: frō 35. degr: the amplit. which the compas sheweth, the remaine being 15. degr. sheweth the compas to be so much varied from the north to the eastward, which is 1. whole point, & about 1. third: otherwise ỹ sun hauing the same amplit: northerly, (as is afore said) & setting him at his

going

going down by the Compasse, the said Cõpas sheweth him to set onely fiue degrees to the northward of the west, which deducted from 20. degrees, the true amplitude leaueth 15. degrees for the variation of the Compasse to the eastward, as before.

## Another Example.

Suppose that the Sun hauing 23. degrees of south amplitude, and the cõpasse sheweth his amplitude or rising to be a 11. degr. northerly, adde 23. degrees the true amplitude with 11. degrees of contrarie amplitude, which the Compasse sheweth, & the product 34. degrees, being three whole points and somewhat more, sheweth that the Compasse is so much varied from the true north to the eastward.

Againe, the Sunne hauing the like amplitude southerly, you obserue at his setting, and finde by your compasse that he setteth 11. degrees northerly, adding the two amplitudes as aforesaide, 23. and 11. the product 34. sheweth the variation so much to the westward, being that in the obseruation at his rising, the east and by north points of the Compasse, standeth where the east southeast should be: and at his setting in the other obseruation, the west and by North points of the Compasse, pointeth to the Sunne, in which place should be the west southwest points. These few words will suffice, being (that albeit to the ignorant they seeme somewhat darke) yet in the practise thereof, they shall finde it I doubt not, but very plaine and easie for their vnderstanding, otherwise there are sundrie sortes of instruments to finde the variation by, but others hauing alreadie written thereof, I haue thought good also to shew my opinion of this plaine and easie way, knowing that the Marriner hauing made experience of many waies, will onely vse that which he findeth best, both for his ease, profit, and truth thereof. And note that whatsoeuer is here spoken concerning the finding of the variation by the Amplitude, the very like may be also obserued by the Azimuth, which by the Sunne or Starres being to be seene, may at any time be knowne.

How

## *How many Leagues saiting vpon any point of the* Compasse will raise or lay a degree of Latitude, and what difference of Longitude you make therewith.

THis is so common in euery booke, that I nede not to wright thereof, but onely being that it is a necessarie helpe to that which hath bene before spoken of, it is not amisse to set it here downe, being as followeth.

First, sailing south or north you kepe still one Meridian: and in sayling 20. english Leagues you either raise or depresse ỹ pole one degree: But if you saile vppon the first point or Rombe from north to south, either eastward or westward, you must saile 20. leagues and one third part to raise or lay a degree of Latitude: and hauing so changed your paralell one degree, you are also departed frō your first Meridian 4. leagues that way which your course was.

Upon the second point or romb frō north or south, 21. leagues and one third, raise or lay one degree of Latitude, and your distance from the first Meridian is 8. leagues and one third.

Sailing vpon the third point, 24. leagues, raise or lay a degree and distance frō the first Meridian, is 23. leagues, and one third.

Upon the fourth point 28. leagues and one third raisē or lay a degr. at Latitude, and distāce frō the Meridian, is 20. leagues.

Upon the fift point, 36. leagues, raise or lay a degree of Latitude, and distance from the Meridian is 30. leagues.

Sailing vpon the first point or Rombe 52. Leagues and one third, raise or lay a degree, and hauing altered your Latitude one degree vpon that point, you are departed from the first Meridian 45. leagues and one third.

If you saile vpon the seauenth point, being the next from the east or west, you must saile 102. leagues, and two thirds, before you raise or lay the pole one degree, and thē are you 101. leagues from your first Meridian, but if you saile east or west, then are you still in a paralell, and neither raise nor lay the Pole at all.

To

## To finde the distance betweene any two places, knowing the Longitude and Latitude of them.

IF the two places differ only in Latitude, then are they both vnder one and the same Meridian: and to knowe the distance betwixt them in miles or leagues, multiply the number of the degr: of difference, by 60. miles or 20. leag: the product of which multiplication giues the true distance betweene them in miles or leag: according as you worke them, being that 60. miles or 20. leagues make one degree of a great Circle: but if the one place haue north Latitude, and the other South, then adde both their latitudes together, and worke as aforesaid: and if both the places are vnder the Equinoctiall, then haue they no Latitude: and there likewise 60. miles, or 20. leagues make 1. degree, and the working is like the former, if the difference be vnder 180. degrees: For if the difference be more then 180. substract the said difference from 360. and multiply the remainer by 60. or 20. as afore.

These are so plaine and easie, that they neede no Examples: but if they differ both in Longitude and Latitude, or in Longitude onely, in any Paralell beside the Equinoctiall, the working is somewhat more difficult, by reason that the further the Paralels are distant frō the Equinoctiall toward eyther of the Poles, the shorter they are: and the shorter the Paralels are, the fewer min: or miles make a degr: so that whereas in the Equinoctiall 60. min: or miles make a degree in that Paralell where the Pole is raised 52. degr: 37. mi: makes 1. degr: viz. one degr: in ỹ Lati: of 52. in running East or West, answers to 37. miles: for which purpose, as also for diuers necessary vses, I haue here added a table, shewing the miles of distance and minuts of Time, answerable to a degr: in euery seuerall degr: of Latitude, from the Equinoctiall towards eyther of the Poles: And when you know the miles answerable to a degree in the Paralell desired, if the difference of the two places be onely in Longitude, multiply the difference of they^r Longitude by the number of miles answerable to a deg: and the product sheweth the distance in English or Italian miles betwixt the saide two places.

Exam-

| Miles to a de. | Deg. of Latit. | Miles to a de. | Deg. of Latit. |
|---|---|---|---|
| 0 | 60 | 60 | 30 |
| 10 | 59 | 61 | 29 |
| 15 | 58 | 62 | 28 |
| 18 | 57 | 63 | 27 |
| 21 | 56 | 64 | 26 |
| 23 | 55 | 65 | 25 |
| 26 | 54 | 66 | 24 |
| 28 | 53 | 67 | 23 |
| 30 | 52 | 68 | 22 |
| 32 | 51 | 69 | 21 |
| 34 | 50 | 70 | 20 |
| 35 | 49 | 71 | 19 |
| 37 | 48 | 72 | 18 |
| 38 | 47 | 73 | 17 |
| 40 | 46 | 74 | 16 |
| 41 | 45 | 75 | 15 |
| 42 | 44 | 76 | 14 |
| 44 | 43 | 77 | 13 |
| 46 | 42 | 78 | 12 |
| 47 | 41 | 79 | 11 |
| 48 | 40 | 80 | 10 |
| 49 | 39 | 81 | 9 |
| 51 | 38 | 82 | 8 |
| 52 | 37 | 83 | 7 |
| 53 | 36 | 84 | 6 |
| 54 | 35 | 85 | 5 |
| 55 | 34 | 86 | 4 |
| 57 | 33 | 87 | 3 |
| 58 | 32 | 88 | 2 |
| 59 | 31 | 89 | 1 |

Example.

London and Middelbrough haue both in a mãner one Lati. viz. about 52. deg. and I finde in this Table, that in the paralell of 52. 37. miles make a degrꝛe of Longitude, the Longi: of London is 25. degr: 50. mi: & the Longi: of Middlebrough is 29. degr: 40. min: which substracted one frõ another, leaues 3. deg: 50. mi: for the differẽce of Longitude: Then multiplying 3. deg: by 37. miles, the product is 111. miles: then for 50. min: I say by the rule of thrꝛe, if 60. minu: giue 37. miles, what giues 50. min? facit nere 31. which added to 111. makes 142. miles, or 47. leagues, and a mile for the distance betwixt London and Middlebrough.

But if the 2. places differ both in Longitu: and Latitude, then is the worꝛking more difficult then eyther of the former: for first you must take the differẽce of the two places in Long: and then theyr difference also in Lati: and multiplying the deg: of their difference in Lati: by 60. set the product thereof by it selfe, for the first Number: then multiplye the difference of Longitude, by the number of miles answerable to each Latit: seuerally, and adde both the products together: the halfe wherof set downe for your second Number, and multiplying each of these said 2. numbers into it self squarely, adde both the products together, & extracting the square rote therof, the said square rote is the distance of miles, betwixt the two places desired.

As for Example.

To goe directly in a right line from Callice in France, to Constantinople in Gretia: I find by the Tables following, that the Longi: of Callice is 29 deg. 10. min: and the Lati: thereof 50. deg. 40. min. Also the Longitude of Constantinople is 61. deg: 20. mi: & the latit: 44. degr. 40. mi: thẽ substracting

the

the lesser Longitude, from the greater, the difference of Longitude is 32. degr. 10. minu.

Longit. { Constant. 61. deg. 20. mi: / Callice 29. deg. 10. min: / Differēce, 32. deg. 10. mi: }

Also I take the one Latit. frō the other, & there rests 6. deg: for the differēce thereof, which 6. degr: multiplyed by 60. miles, produceth 360. miles for the distance betwixt the paralell of Callice, and the paralell of Constantinople. Now for the distance betwixt Callice, and the meridian of Constantinople, I multiplie thirtie two degrees ten minu: the difference of Longitude by thirtie eight, the miles answerable to a degree in the paralell of Callice, and the product is 1222. miles: Then I multiplie thirtie two degrees ten minu: the aforesaid difference of Longitude by 42. the miles answering to a degree in the Paralell of Constantinople, which product being 1351. miles, is the distance betwēn Constantinople, and the Meridian of Callice: Those two distances added together make 2573. the halfe whereof, being 1286. is the meane distance betwixt the Meridians of the said two places: So haue you two Numbers, viz: 360. miles, the distance that the Paralell of Constantinople is to the Southwardes of Callice, and 1286. miles, the distance that Constantinople is to the eastward of the Paral: of Callice: Therefore if you multiply 360. into it selfe, the product is 129600. & likewise multiplying 1286. into it selfe, the product is 1653796. which both added together, make 1783396. the square roote of which number is the distance desired: which to helpe those that are not perfit in extraction of rootes, I haue here set downe the working thereof as followeth. —

Latit. { Callice, 50. degr: 40. min: / Constant: 44. deg: 40. mi: / Difference, 6. deg: 0. min: }

1222
1351
2573
1286

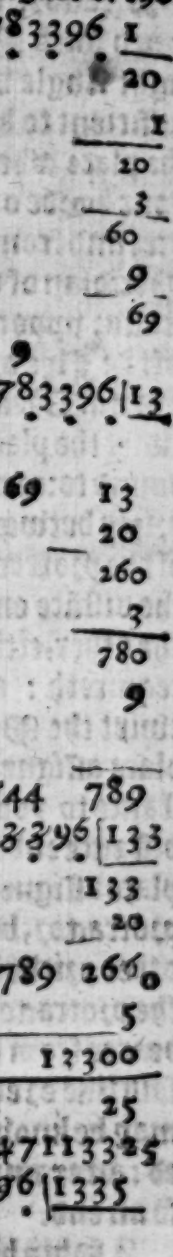
1653796
129600.
1783396

1783396 | 1
1

the manner how to extract the square and Cube roote of any number is more plainly taught, toward the ende of the Booke.

First, I set downe the proposed number, with a Quotient, and vnder the last Figure, I put a pricke: and so likewise vnder each other Figure toward the left hand, leauing betwixt each pricke one Figure vnprickt: so haue I vnder this number 4. prickes, signifying that the

rote must consist of foure figures, and to finde them out, I seeke what is the greatest square number ouer the first prick, which is 1. therefore I put 1. in ỳ quotient for ỳ first figure of the rote, & call the figure ouer the first prick: thẽ to finde the 2. figure of the rote, I multiply the quotiẽt by 20. which being 1. doth neither multiply nor diuide: therefore I seek how often 20. is contained in 78. the number of the second prick, which you must take no oftner then ỳ the square of the said number being added therewith, may be likewise taken therefrom, so I see 3. times 20. being 60. and the square of 3. which is 9. added therto, is 69. which may be taken there frõ: therfore I put 3. in the quotient, taking 69. frõ 78. the number ouer ỳ second prick leaues 933. to the third prick: Thẽ for the third figure of the rote, I multiply 13. the quotient by 20. the product is 260. which I seeke how often it may be taken out of 933. & I find ỳ 3. times 260. is 780. wherunto ỳ square of 3. being added, make 789. therfore I put 3. in the quoti. and substracting 789. frõ 933. rests 14496. for ỳ fourth prik: thẽ for ỳ last figure of the rot, I multiply 133. the whole quotient already found by 20. & the product is 2660. which may be taken 5. times in 14496. for 5. times 2660. is 13300. vnto which 25. the square of 5. added, makes 13325. therefore I put 5. in the quotient, for the fourth & last figure of the rote: and making my substractiõ as afore, the worke will stand as you see, by which you may knowe the square rote of the proposed number to be 1335. & very nere $\frac{3}{7}$ So I conclude the true distance betweene Callice and Constantinople to be 1335. miles, and nere halfe a mile. The manner how to extract the rote of any number, is set downe more at large hereafter.



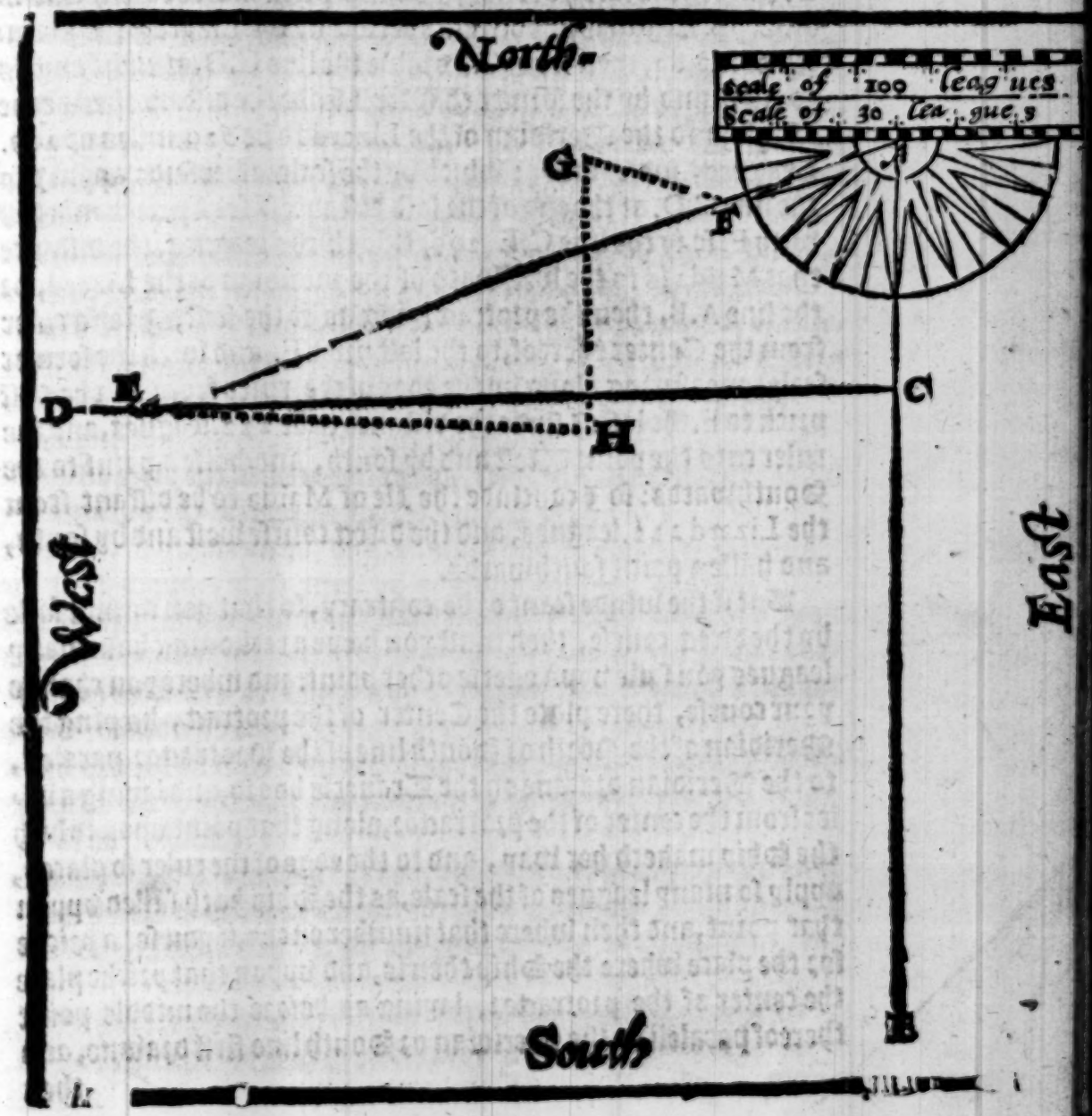
The ingenious Mariner may saile by knowing the true Longitude and Latitude of places, to any place assigned, as well as by his Sea Carde, by the helpe of the Trauerse bord and a Protractor, in this manner: first vppon the boorde or paper lyned with Meridians and paralells, or to them that can make a right Angle vpon any pricke or point, a sheete of cleane Paper is sufficient to kéepe a Trauerse vpon: To know your course from the place where you are, to any other place assigned: as I say vpõ your bourde or paper make a pricke for the place where you then are, and from the saide pricke drawe a right lyne to represent the Meridian of the same place, then placing the center of the protractor vppon the saide pricke, lay the North or South point of the Fyre or protractor, as the place beareth vpõ the line readye drawn. Then by the last Chapter learne the distance of miles betwixt the place where you are, and the paralel of the place you are bound to: or more briefely, what portion of the Meridian is comprized betwæn ỳ Lat. of the two places, that distance by the scale of the protractor, apply to the Meridian by you drawne, & where the distãce endes, draw another line square, or at right angles to the other, either east or west, as the scituatiõ of the place assigned requireth: and by the former Chapter learne the distance betwixt the Meridiã by you drawne, and the meridian of the other place assigned: which knowne by your scale, apply that distance to your lyne of East or West, and where that number of distance endes, make another pricke for the true scituatiõ of your place assigned: then laying a thrid or ruler frõ the Center of the protractor, being the place where you are, and extending it to the other pricke last made, the edge of the ruler or lyne shewes vpon the protractor, the point of the compasse that the place assigned beares from the place where you are: and the scale applyed to the said line or edge of the ruler, shewes the distance: also the distance may be knowne by extracting the square rote, as is before shewed: an example of this, and for the vse of the trauerse bord, and so an end.

A Ship being at the Lysard, in the south west partes of England, whose long. & lait. I finde in the Table following to be 18.

degrées

deg. 30. min. & 50. deg. 10. min. is bound for an Iland in the Ocean Sea called Maida, whose Long. I finde in the same Table to be 2. deg. 40. mi. & lati. 46. deg. 40. mi. the difference of their lati. is 3. deg. 30. mi. which is 210. miles, or 70. leagues: therefore from

The Type of a Trauerse boord and a Protractor.



the prick or point A. I draw the line A.B. in the trauerse boord heere adioyning, and vppon the point A. I place the Center of the protractor, being one halfe of ỳ Mariners Compasse, the middle point whereof representing the north or south (as occasiõ serues) I lay vpon the line A.B. and applying 70. leagues (whereof the scale on the edge of the protractor containe 100.) from A. towards B. Where the said 70. ends, I make a prick marked with C. so is A.C. 70. Leagues, the distance betweene the Lizard & the Paralell of Maida, then from C. I drawe the line C.D. at right angles to A.B. and by the former chapter I finde the distance betweene Maida, and the Meridian of the Lizard to be 629. miles or 209. Leagues, and 2. miles: which by the scale aforesaide applied to the line C.D. at the end of the said distance, I set a pricke marked with E. so is the line C.E 209. two thirds leagues, the distance that Maida is to the westward of the meridian of the Lizard, or the line A.B. then the protract lying as at the first, I lay a ruler from the Center thereof, to the last prick E. and with the former scale, measuring along by the edge of the ruler from A. the first prick to E. the last: I finde the distance to be 222. leagues, and the ruler cuts the point West and by south, and halfe a point to the Southwards: so I conclude the Ile of Maida to be distant from the Lizard 222. leagues, and the direct course west and by south, and halfe a point southwards.

But if the winde scant or be contrary, so that you cannot saile by the direct course, then must you kæpe a reckoning how many leagues you saile vpon euerie other point: and where you change your course, there place the Center of the protract, kæping the Meridian of the North or South line of the Protractor paralell, to the Meridian drawne on the Trauerse boord, and laying a ruler from the center of the protractor, along that point vpon which the Ship maketh her way, and to the edge of the ruler so placed, apply so many leagues of the scale, as the Ship hath sailed vppon that point, and then where that number endes, if you set a pricke for the place where the Ship then is, and vppon that pricke place the center of the protractor, laying as before the middle point thereof paralell to the Meridian or South line first drawne, and

then

then laying a ruler to the ceter of the Protractor, being the place where the ship then is, and to the place assigned, it shewes vpon the Protector, the point how they beare, and the scale applyed thereto, shewes the distance, as in the former example: having sayled from the Lyzard, in the right course 50. leagues, being then in the point F. the winde commeth to another point, so that she maketh her way west & by north 40. leagues: at the end of which course, is the letter G. from thence she runneth south 75. leagues: at the end of which course is H. then from H. to know the distance, and what course must be kept to the prefixed place of Maida marked with E. I place the center of the protector vpon H. and the middle point of the Fly, which is then the north point paralel or equidistant to the first line A.B. which so placed, I lay a ruler from the center thereof to E. and the course is West, and halfe a point to the North, 125. leagues.

Note, that it is necessary to haue vpon your protractor two seuerall Scales, a greater and a lesser, for the greater the scale is you kæpe your reckoning by, the truer shall your account be.

## Necessarie questions of Nauigation, with their answeres.

Q. 1 If I saile from the paralell of 50. degr. 70. leagues vpon a southwest course, I demaund how much I lay or depresse the Pole, and how many degrees and leagues I depart from the meridian?

A Pole depressed two degrees, 28. minuts, difference of Longitude three degrees, 45. minutes, leagues from the Meridian 50. three quarters.

Q. 2 If I saile from the paralell of 40. degrees, vpon a west Northwest course, vntil I raise the pole 3. degrees 30. minutes, I demaund how many leagues I haue sailed? and how many degrees and leagues I haue departed from the Meridian?

A Leagues sailed 183. difference Longitude 11. degrees 5. minutes, leagues from Meridian. 158.

Q 3 From the paralell of 47. degr. if in sayling 108. leagues betweene west and north, I raise the pole 3. degrees, I demaund vpon what rombe I haue sailed: as also how many degrees and leagues I am from the Merid. from whence I began that course?

A Rombe north west and by west, difference Longitude 6. degrees 50. minutes, leagues from the Meridian 90.

Q 4 If from the paralell of 50. degrees, I saile so long betweene north and east, till I raise the pole 6. degrees, and depart from the merid. 4. deg. I demaund vpon what point of the Compasse I haue sailed, and how many leagues I haue runne?

A The course is neere north northeast leagues runne 128.

Q 5 If frō the paralell of 50. degrees, I saile north west, vntill I am 4. degrees from the meridian where I began my course, I demaund how many leagues I haue sailed, and how much the pole is raised?

A Leagues sailed 7⅔. and 2. thirds, pole raised 2. deg. & a half.

Q 6 Two ships departing from one place in the paralel of 50 degrees, the one in sayling 145. leagues towards the west, hath raised the pole 4. degrees, & the other hath raised the Pole 7. degrees, and is 95. leagues west from the meridian of the place frō whence he began his course: I demaund by what course the said ships haue sailed, how many leagues the 2. ship hath sailed, how farre they be asunder, and by what course they may meete?

A The first ship hath sailed northwest and by west, 4. degrees westerly: The second hath sailed north west by north 2. degr. 45. minutes westwards, 172. leagues and halfe a mile, they are asunder 65. leagues, three quarters of a mile, and the course betweene them is north northeast, and south southwest.

Q 7 Two ships departing frō one place in the paralel of 60. degrees, the one in sayling 45. leagues towards the west, hath raised the pole 4. degrees, & the other hath raised ỹ pole 7. degrees, and is 95. leagues west from the meridian of the place frō whence he began that course: I demaund by what course the said ships haue sailed the way of the 2. ships, how farre they be asunder, and by what course they may meete?

A The first ship hath sailed Northwest and by west, the second

cond hath sailed northwest and by north 167. leagues, they are asunder 64. leagues, haue a point northerly course betwixt them is north northeast.

Q. 8. Two ships sailing from one place in the paralell of 60. deg. the one sailing 180. leagues eastwards, hath raised the pole 5. degr. I demaund upon what course, and how many leagues the other ship shall saile to bring himselfe 50. leag. north by W. from the first ship, & what they are both departed from their first Meridian?

A. The first ship hath sailed northeast and by east, & is departed from the Meridian 146. leagues. The second ship must saile northeast 3. degrees northerly, leagues 200. and is departed frō the Meridian where he began his course 123. leagues.

Q. 9. If I saile from the paralell of 50. degrees, 100. Leagues north, I demaund what latitude I am in?

A. In the latitude of 55. degrees.

Q. 10. If I saile from the paralell of 50. deg. south, till I lay the Pole 5 degrees, I demand how many leagues I haue sailed

A. 100. leagues.

Q. 11. If from Long: 22. deg: I saile in the paralell of 60. degrees 100. leagues east, I demaund what longitude I am in?

A. In Longitude 32. degrees.

Q. 12. If from long. 2 . degrees, I saile in the paralell of 50. degrees, to Longitude 10. degrees, I demaund how many leagues I haue sailed?

A. Leagues 154. and a quarter.

Q. 13. If I saile from Longitude 20. degrees, and Latitude 40. to longitude 350. degrees 7. min. and Latitude 30. degrees, I demaund the rumbe and distance?

A. Course west southwest, distance 500. leagues.

Q. 14. From long. 22. deg: and latitude 45. degrees, northest 20. leagues, what longitude and latitude hath the second place?

A. 23. degrees longitude 45. degrees. 42. minutes latitude.

Q. 15. From longitude 23. degrees, and latitude 45. degrees, 42. minutes east and by north 20. leagues, what longitude and latitude hath the second place?

A. 25 degr: 9. min: longitude 4 . deg. 59. minutes latitude.

Q 16 From Longitude 25. deg. 9. mi. and lati. 45. deg. 59. min. east south east 25. leagues. What longitude and latitude hath the second place?

A 26. degrées 53. minutes longitude, 45. degrées 31. minutes latitude.

Q 17. From longitude 26. degrées, 53. minutes, and latitude 45. degrées 31. minutes north 40. leagues, What longitude and latitude hath the second place?

A Longitude 26. degrées 53. minutes, latitude 47. degrées 31. minutes.

Q 18 From longitude 26. degrées, 53. minutes, and latitude 47. degrées 31. minutes 50. leagues west north west, What longitude and latitude hath the second place?

A Longitude 23. degrées 17. minutes, latitude 28. degrées 28. minutes.

Q 19 From longitude 23. degrées 17. minutes, and latitude 48. degrées 28. minutes East north east 60. leagues; What longitude and latitude hath the second place?

A Longitude 27. degrées 17. minutes, latitude 49. degrées 36. minutes.

## Here followeth a briefe Table of sines for Arethmeticall Calculation, the totall sine whereof is 10000. with certaine necessarie propositions to be *wrought thereby, by which few things proposed, and the examples* thereto annexed, any one that hath either an ingenious spirit, or a willing minde to the practise of the Mathematicall Sciences, may attaine to much knowledge therein.

### *A briefe declaration of the same.*

What the Table of sines is, hath beene very learnedly explained by others, and therefore needlesse is it for me to

to discourse thereof: only take these few instructions for the help of those, which as yet haue no knowledge therein. First know, that sailing which is the principal thing here aimed at, is performed by a true and perfit knowledge of the Spheare, by the projection whereof, all calculations, tables calculated, and instruments for observation are inuented, protracted, framed & made. What the Spheare is I neede not to discusse, the chiefe or great Circles thereof consisting of 360. degrees, and one quarter thereof being 90. degrees, which quarter being taken from the whole circumference, consisteth of these three particulars, viz. An arche or part of a circle being indeed 90. degrees, or a quarter of the whole circle: a right angle, and two equals sides thereto, of which the one is ỹ base or groũd line, ỹ other a perpendicular let fall thereon at right angles, the vtmost endes or extentions of which two lines are the limmits of the foresaid arch, or quarter of a circle: the which three parts so fitted together in their due order, sheweth the perfit platforme of one quarter of the whole Circle, commonly called a quadrant: the base or ground line whereof being deuided into 10000. equall parts, is sinus totus or the whole sine: and the whole arch or quarter of a Circle into 90. degrees, is the whole arch belonging to the said whole sine.

Within which quadrant, any number of degrees or minutes counted frõ ỹ beginning or first perpendicular, may be called an arch, or part of a circle: & another perpendiculer let fal there from to the aforesaid base or ground line, the number of equall parts that the saide perpendiculer falleth vpon, is the right sine to the arche giuen: and the complement of the arch giuen, is the remainer thereof, it being taken from 90. degrees or the whole quadrant. To finde out the right sine of any giuen arch, looke in the heade of the Table following for the degrees thereof, and if there be any minutes therewith, looke for the minutes at the left side of the Table, and carrying your eye downeward from the degree, till you come right against the minutes, the number which you finde in the common angle to them both, is the right sine of your giuen arch desired: as if you desire the sine of 35. degrees 20. minutes, looke in the head of the Table for 35. and

vpon

vpon the left side thereof for 20. and in the common square or angle right against them both, you shal finde 5783. which is the sine of 35. degrees 20. minutes, & if you substract 35. degrees 20. minutes from 90. degrees, the remainer 54. degrees 40. minutes is the complement thereof, whose right sine (found as before is taught) is 8158. what the versed sine is and how found out, is afterward shewed. I doubt not but that these fewe words will suffice for the explayning of the Table following, whose large & ample vses for navigation and other the mathematicall practises these following exemplarie propositions, will in some reasonable sort make manifest; by which few here proposed and answered, the ingenious may gather the manifold vses thereof, being that indeed the benefit to be reaped thereby is great, and the propositions to be wrought thereby infinite, (who so desires more perfection in this kind of navigation and generally in all mathematicall practises, let them spēd some time in the studie of *Pitiscus*; of the doctrine of Triangles, newly translated and published in our english tongue, by M. Ralphe Handson.

## *Certain propositions to be wrought by the table of sines*

### The Sunnes true place being knowne, to finde his Declination.

AS the whole sine to the sine of the greatest declination, so is the sine of the Sunnes distance from the neerest equinoctiall point, to the sine of the declination for the day proposed.

Example.

I would know the declination of the sun the 1. of May 1614. at what time the true place of ☉ sun being in 2. degr. 25. min. of Taurus, is 30. degr. 25. min. from the beginning of Aries, or the vernall Equinoctiall point, therefore I must multiply the sine of 30. deg. 25. min. the Suns distance from the Equinoctiall point by the sine of 23. deg. 30. min. the greatest declination, and that product must be deuided by the whole sine, whose seuerall sines being found out in the table following, and set in order, thereby ye will

If 90 give 23. 30 what 30. 25 (and thus:

10000 398 7707

Facit. 3072. whose neerest arch 17. 54. min. is the true declination of the ☉ sunne, the day and yeare aforesaid.

The

The Declination of the Sunne giuen to finde his place in the Zodiacke. Prop. 2.

AS the sine of the greatest declination to the whole sine, so is the sine of the declination for the day proposed to the suns place or distance from the nearest equinoctiall point.

Example.

The 11. of May, 1614. I finde that the declination of the Sun is 17 deg. 54. mi. north, therefore I say

If 23.38 giue 90 what 17.54

3987 10000 3073

Facit 7705. whole arch 50. degr. 5. min. is the Suns distance from the vernall equinoctial point of Aries, frō which taking 30 degr. the whole sine of Aries, the remainer 20. degr. 25. minuts shewes the sun to be so much entred into Taurus, which is the next signe.

The latitude and declination of the Sunne giuen, to finde the amplitude. Pro. 3.

AS the sine of the cōplement of the latitude is in proportion to the whole sine, so is the sine of the suns declination to the amplitude.

Example.

The 16. of Aprill, 1616. I desire the amplitude of the Sun, viz. how much the sun doth rise and set frō the true east & west point of the horizon towards the north or south in the latitude of 51. degrees 40. min: to know which, the worke is thus.

If 38. degr. 20. mi. the cōplement of the latitude giue 90. degr. the arch of the whole sine, what giues 11. degr. 43. mi. the declination of the sunne?

38. degr. 20. min. 90. 11. 43. minutes,

6208 10000 2701

Facit 3275 whole arch sought out in the Table of sines, is 19 degr. 7. mi. for the amplitude in the day, vpon the place proposed: the same deuided by 11. 43. quart the number of degr. that belongs to a point of the compasse, they with one point 7. deg. and 52. mi. which the sun riseth and sets to the northward of the east and west, being that the declination is north, for if the declination were south, then were the amplitude southerly.

The

## The Declination and amplitude of the Sunne giuen, to finde the height of the Pole.

### Prop 4.

As the Sine of the amplitude is in proportion to the Sine of the Declination, so is the whole sine to the sine of the complement of the Latitude.

### Example.

The Declination 11. degrees 43. minutes, and the amplitude 19. degrees 7. minutes. I demaund the height of the Pole: say

| | | | | |
|---|---|---|---|---|
| If 19.7. | giue | 11.43 | what | 90 |
| 3275 | | 2031 | | 10000 |

Facit 6202, whose arche in the Table of sines being 38. degr. 20. minutes, is the height of the Equinoctiall, or the complement of the Latitude, that substracted from 90. degrees, leaues 51. degr. 40. minutes for the height of the Pole or Latitude of the place desired.

## The true place and Declination of the Sunne giuen, to finde the right ascention.

### Prop. 5.

As the sine of the complement of the declination is to the totall sine, so is the sine of the complement of the Sunnes distance from the beginning of Aries, to the complement of the right ascention.

### Example.

I desire the right ascention of the Sun the 20. of April, 1617. being then in 10. degrees of Taurus, at which time his declination is 14. degrees 51. minutes, and the complement therof 75. degrees 9. minutes, and the distance from the beginning of Aries 40. degrees, whose complement is 50. degrees. I say then

| | | | | |
|---|---|---|---|---|
| If 75.9. | giue | 90. | what | 50. degr. |
| 9667 | | 10000. | | 7660 |

Facit

Facit. 7923. whose arch in the Tables of sines is 52. degrées 24. minutes, the complement whereof 37. degrées 36. minutes, is the Sunnes right ascention: the same conuerted into houres by allowing 15. degrées to an houre, giues two houres and 30. mi. This is to be vnderstood, when the Sunne is betwixt the beginning of Aries, and the Tropicke of Cancer, for if the Sunne be in the tropicke of Cancer, then is the right ascentiõ 90. degrées or 6. houres: and if the Sunne be betwixt the tropicke of Cancer and the Equinoctiall point of Libra, subtract the distãce that the Sun is from the beginning of Aries, out of 180. deg. and with the remainer worke as before for the right ascention, which ascention so found, take from 180. and the remaine is the right ascention desired. But if the Sunne be betwixt the Equinoctiall of Lybra, and the tropicke of Capricorne, subtract the saide distance from the beginning of Aries, out of 270. degrées, and if betwixt the tropicke of Capricorne, and the beginning of Aries, take the saide distance out of 360. degrées, and then worke as before. One example or two will make all this plaine vnto you.

The last of June 1615. the true place of the Sunne 17. degrées 46. minutes of Cancer, is 107. degrées 46. minuts from the beginning of Aries, which taken from 180. leaues 72. degrées 14. minutes, whose complement is 17. degrées 46. minutes, the Sunnes declination, then is 22. degrées 19. minutes, the complement thereof 67. degrées 41. minutes. Say. then.

If 67. 41. giue 90. what 17. 46. minutes?

9251. 10000. 3051.

Facit 3298. whose arch is 19. deg. 15. mi. the complement whereof 70. deg. 45. mi. taken from 180. leaues 109. deg. 15. mi. for the right ascention desired, which conuerted into hours. makes 7. ho. 17. min. Again, I desire the right ascention of 20. deg, 40. mi. of Capricornus, whose distance in continuall proceeding from the beginning of Aries, being 290. degrees 40. minutes taken from 360. leaues 69. degrees 20. minutes, with the complement whereof 20. degrees 40. minutes, and the complement of the declination of the Sunne vpon the same point of the Sunnes place 68. degrees 6. minutes, I worke as followes.

If

If 68. 6. giue 90. what 20.40
9278. 10000. 3529.

Facit 3803. whose arch is 22. degrees 21. minutes, the complement whereof 67. deg. 39. minutes taken from 360. leaues 292. degrees 21. minutes for the right ascention desired, the same conuerted into houres is 19. houres 29. minutes.

The Latitude and Declination of the Sunne knowne, to finde the difference ascentionall.

Prop. 6.

As the sine of the complement of the Latitude is to the sine of the Latitude, so is the sine of ỹ declinatiõ to the quotient found: againe as the sine of the complement of the declination is to the whole sine, so is the said quotient found to the difference ascentionall.

Examples.

I would know the difference ascentionall the 10. of May 1612. the declination being then 20. degrees 6. minutes, and the Latitude 51. degrees 40. minutes, I say.

If 38.20. giue 51.40. what 20. 6.
6202. 7844. 3437.

Facit, 4346. for the quotient found: then againe I say.

If 69.54. giue 90. what
9391. 10000. 4346.

Facit. 4624. whose arch in the table of sines, 27. degrees 34. minutes is the differẽce ascentionall for the day proposed: ỹ same reduced into houres and minutes, makes one houre and 50. minutes, which taken from 6. a clocke, the houre that the Sunne riseth, being in the Equinoctiall, leaueth foure houres 10. minutes,

nutes, at what time the Sunne then riseth, and the saide ascentiõall difference added to 6. a clocke, makes 7. a clocke, 50. minut. for the Sunne setting.

Againe, the saide ascentionall difference doubled and added to twelue houres, the time from 6. in the morning till 6. at night makes 15. houres 40. minutes for the whole length of the day.

This is when the Sunne hath north Declination, for if the Declination be south, then the ascentionall difference added to fiue a clocke, giues the Sunnes rising, and taken from 6. leaues the setting, and being doubled and taken from twelue houres, leaues the length of the day as aforesaid.

## The amplitude and difference ascentionall of the Sunne or Starre giuen, to finde the Declination.

### Prop. 7.

As the sine of the time of the Sunne rising, conuerted into degrees and minutes, is to the sine of the complement of the amplitude, so is the whole sine to the sine of the complement of the Declination.

Example.

The difference ascentionall being 27. degrees 34. minutes shewes the Sunne to rise at 4. a clocke 10. minutes, which conuerted into degrees makes 62. degrees 30. minutes, and the amplitude being found as before is shewed in the third Prop. is 33. degrees 38. minutes, and the complement thereof 56. degree 22. minutes. Say then.

| | | | | |
|---|---|---|---|---|
| If | 62.30. | giues | 56.22. | what 90. |
| | 8870. | | 8326. | 10000. |

Facit. 9386. whole arch 69. degrees 50. minutes, the complement thereof 20. degrees 10. minutes, is the declination desired.

The

As 68. 6. giue 90. what 20.40.
9278. 10000. 3529.

Facit 3803. whose arch is 22. degrees 21. minutes, the complement whereof 67. deg. 39. minutes taken from 360. leaues 292. degrees 21. minutes for the right ascention desired, the same conuerted into houres is 19. houres 29. minutes.

The Latitude and Declination of the Sunne knowne, to finde the difference ascentionall.

Prop. 6.

As the sine of the complement of the Latitude is to the sine of the Latitude, so is the sine of ☉ declinatiõ to the quotient found: againe as the sine of the complement of the declination is to the whole sine, so is the said quotient found to the difference ascentionall.

Examples.

I would know the difference ascentionall the 10. of May 1612. the declination being then 20. degrees 6. minutes, and the Latitude 51. degrees 40. minutes, I say.

As 38.20. giue 51.40. what 20. 6.
6202. 7844. 3437.

Facit. 4346. for the quotient found: then againe I say.

As 69.54. giue 90. what
9391. 10000. 4346.

Facit. 4624. whose arch in the table of sines, 27. degrees 34. minutes is the differẽce ascentionall for the day proposed: ☉ same reduced into houres and minutes, makes one houre and 50. minutes, which taken from 6. a clocke, the houre that the Sunne riseth, being in the Equinoctiall, leaueth foure houres 10. minutes,

nutes, at what time the Sunne then riseth, and the saide ascentiõall difference added to 6. a clocke, makes 7. a clocke, 50. minut. for the Sunne setting.

Againe, the saide ascentionall difference doubled and added to twelue houres, the time from 6. in the morning till 6. at night makes 15. houres 40. minutes for the whole length of the day.

This is when the Sunne hath north Declination, for if the Declination be south, then the ascentionall difference added to fiue a clocke, giues the Sunnes rising, and taken from 6. leaues the setting, and being doubled and taken from twelue houres, leaues the length of the day as aforesaid.

## The amplitude and difference ascentionall of the Sunne or Starre giuen, to finde the Declination.

### Prop. 7.

As the sine of the time of the Sunne rising, conuerted into degrées and minutes, is to the sine of the complement of the amplitude, so is the whole sine to the sine of the complement of the Declination.

Example.

The difference ascentionall being 27. degrées 34. minutes shewes the Sunne to rise at 4. a clocke 10. minutes, which conuerted into degrées makes 62. degrées 30. minutes, and the amplitude being found as before is shewed in the third Prop. is 33. degrées 38. minutes, and the complement thereof 56. degrée 22. minutes. Say then.

| | | | |
|---|---|---|---|
| If | 62.30. | giues | 56.22. what 90. |
| | 8870. | | 8326. 10000. |

Facit. 9386. whole arch 69. degrées 50. minutes, the complement thereof 20. degrees 10. minutes, is the declination desired.

The

## The Latitude and Declination giuen, to finde the Meridionall altitude.

### Prop 8.

IF the sunne haue north Declination, adde the complement of the Latitude with the declination, the product is the Meridionall altitude.

Example.

If the Declination be 23. degrees 30. minuts, and the Latitude 51. degrees 40. minutes, the complement thereof 38. degrees 20. added with 23. 30. mi. makes 61. degrees 50. min. for the meridian altitude: but if the declination be 23. degrees 30. south, and the latitude 51. degrees 40. minutes, substract 23. degrees 30. minuts the declination from 38. degrees 20. minutes, the complement of the Latitude, and the remainer 14. degrees 50. minutes is the altitude desired: and if the sunne be in the equinoctiall, hauing no declination, then is the meridian Altitude equall to the complement of the Latitude.

## The Latitude and Declination known, to finde the height of the Sunne at any houre of the day.

### Prop. 9.

FIrst you are to consider whether the Sunne be in the Equinoctiall or whether he hath north or south declinatiõ for if the Sunne be in the Equinoctiall, thẽ as the whole sine is to the sine of the complement of the Latitude, so is the sine of the complement of the Sunnes distance from noone, allowing 15. degrees for euerie houre to the sine of the altitude desired.

Example.

The 10. of March 1612. the sunne then hauing no declination, the Latitude 51. degrees 40. minutes, I desire the Sunnes height at 9. a clocke before noone, or at 3. after noone, the complement of the latitude is 38. degrees 20. minutes, and 3 houres distance from noone, 45. degrees, whose complement is also 45. degrees. Say then.

If 90. giue 38.20. what 45.
10000. 6202. 7071

Facit. 4385. whose arch 26. deg. is the height of the Sunne aboue the horizon, the time and place proposed.

If the Sun haue declination, then is the working somewhat more tedious, except onely at 6. a clock, either before or after noone, for which houre, as the whole sine is to the sine of the Latitude, so is the sine of the declination, to the sine of the Altitude.

Example.

The 10. of Aprill 1616. the Latitude 51. deg. 40. min. and the declination 11. degrees 43, minutes say

If 90. giue 51. 40. what 11. 43.
10000. 7844 2031

Facit 1593. whose arch 9. deg. 10. min. is the Altitude desired.

But for any other houre of the day if it be lesse then 6. houres, or 90. deg. worke as followes, multiplie the sine of the houres distance from noone by the sine of the complement of the Latit. the product deuided by the whole sine, and the arch of the quotient taken from 90, set apart for the number first found, which number so found, compare with the Latitude, then multiply the whole sine, by the sine of the lesser, and deuide the product thereof by the sine of the greater: and to the complement of the arch of the product adde the declination of the Sunne, if the declination be northerly, or subtract if the declination be southerly, and if the product or remaine be more then 90. degrees take it from 180. and the rest is the second found number, which 2. numbers so knowne.

As the whole sine is to the number first found, so is the second found number to the Altitude desired.

Example.

The 10. of Aprill at 9. a clocke, the Latitude 51. deg. 40. min. the distance from noone 45. degr. and the declination 11. degrees 43. minuts. I desire the Sunnes height: say

If 90. giue 38.20. what 45.
10000 6202 7071

Facit 4385. whose arch 26. deg. taken from 90. leaues 64. deg.

for the first found number, then comparing the Latitude, and it together, the latitude being the lesser, I multiply the whole sine by the sine therof, and deuide by the sine of the first found, saying,

If 64.0 giue 51,40 what 90
8988 7844 10000

Facit 8727. whose arch being 60. deg. 46. mi. to the complement thereof 29. deg. 14. mi. I adde the declination 11. deg. 43. min. and the totall 40. deg. 57. mi. is the second found number, which 2. numbers so knowne, say againe

If 90 giue 64 what 40.57.
10000 8988 6554

Facit 5890. whose arch 36. degr. 5. min. is the Altitude of the Sunne desired.

Againe, if the houre for which you desire the Sunnes height, be more then 6. houres or 90. degres from the meridian, you must substract the said distance from 180. and multiply the sine of the remainer, by the sine of the complement of the Latitude, which product being deuided by the whole sine, the complement of the quotients arch is the first found number, the sine whereof compare with the sine of the Latitude, multiplying the whole sine by the lesser, and deuiding the product by the greater: from the arch of which quotient, if you take the complement of the declination, you haue the second found number, the sine whereof multiplied by the sine of the first found, and the product deuided by the totall sine, the quotients arch is the Altitude desired.

Example.

The 10. of Aprill at 5. in the morning, the Latitude 51. 40. min. the houres distance from noone 7. or 105. degr. which deducted from 180. leaues 75. deg. for the hou. distance, say then

If 90. giue 38,20 what 75.0.
10000 6202 9659

Facit. 5995. whose arch being 36. deg. 50. min. the complement thereof 53. 10. is the first found number: say then againe.

If 53.10 giue 51.40 what 90.
8004 7844 10000.

Facit 9800. from whole arch 78. deg. 30. min. taking 78. deg. 17. min

17.min. the complement of the Sunnes declination, rests 13.mi. for the second found number, which 2. numbers so found, say

| | | | | | |
|---|---|---|---|---|---|
| If | 90 | giue | 53.10 | what | 0.13 |
| | 10000 | | 8004 | | 038 |

Facit 30. whose arch 10. min. is the height of the Sunne aboue the horizon at 5. in the morning, or 7. in the euening, the day and time aforesaid.

The Latitude giuen, to finde how many minutes or miles of the Equinoctiall, make a degree of Longitude in any Paralell. Pro. 10.

As the whole sine is in proportion to 60. so is the sine of the complement of the Lat. to the miles answerable to a deg. in the Lat. desired.

I desire to knowe how many miles in running east or west in the Latitude of 51.deg.40.min. will alter one deg. of Long: say

| | | | | | |
|---|---|---|---|---|---|
| If | 90 | giue | 60 | what | 38.20: |
| | 10000 | | | | 6202 |

Facit 37. for the number of miles, answerable to a deg. in the Latitude desired.

The course and distance giuen to finde out the difference of Latitude. Pro. 11.

As the whole sine is to the miles of way run, so is the sine of the courses dist. from east or west to the min. of difference of Latitude.

Example.

Running west southwest, which is 22.deg.30.min. from the west. 75. leagues or 225. miles, I demaund the difference of Latitude: say

| | | | | | |
|---|---|---|---|---|---|
| If | 90. | giue | 225 | what | 22.30. |
| | 10000 | | | | 3827 |

Facit 86.mi. or one deg.26. min. for the difference of Latitude vpon the said course and distance.

By course and distance giuen to finde the difference of Longitude. Prop. 12.

As the whole sine is to the miles of way that you haue runne so is the sine of the deg. that your course is distant from south or north to the miles that you are departed from your first meri.

Example.

Running northwest and by north which is 33. deg. 45. min. from the north 60. leag. or 180. miles, I demaund the difference of longitude? say

If 90. giue 180 what 33.45.
10000 5556

Facit 100. miles which you are departed from the Meridian to the westward, which if you deuide by the number of miles answerable to a deg, of Longitude, in the Latitude where you then finde your selfe to be, the quotient giues you the deg, and min, of the difference of longitude.

By distance, and departure from the Meridian giuen to finde the course. Prop. 13.

As the miles of distance that you haue runne, is in proportion to the whole sine, so is the miles of your departure from the Meridian to the sine of your course from south or north.

Example.

Being departed from the first meridian 75. miles in the running of 50. leagues, or a 150. miles, I demaund vpon what point I haue sailed, it being betwixt south and west? say

If 150 giue 10000 what 75.

Facit 5000. whose arch 30. degrees is the distance from south towards west that the course is, which is south west and by south southerly.

The Latitude, declination, and height of the Sunne giuen, to knowe the houre of the day.

Proposition. 14.

Adde the complement of the Latitude, and the declination together, and from the sine of the totall, subtract the sine of the Altitude obserued, the remainer is your number first found, which number first found, multiply by the whole sine, and deuide by the sine of the complement of the Latitude, the quotient, whereof is the 2. found number, which second number so knowne as the sine of the complement of the declination is to the totall sine, so is the said second found number to the quotient, which quotient taken from the whole sine, the complement of the arch

to the

to the remainer, is the Sunnes distance from none in degr. and minutes.

Example.

The 15. of May the declination 21. degr. 4. minutes, and the complement of the Latitude 38. degr. 20. min. added together, is 59. degr. 24. minutes, the sine thereof 8607. the height of the Sunne obserued 48. degrees 30. min. the sine thereof 7490. the which taken from the former number, leaues 1117. for the first found number, then I say,

If 38.20 giue 90 what
6202 10000 1117

Facit 1801. for the second found number, againe say:

If 68.56 giue 90 what
9332 10000 1801

Facit 1929. which taken from 10000. leaues 8071. whose arch 53. deg. 49. min. subtracted from 90. leaues 36. degrees 11. min. for the Sunnes distance from the Meridian: that conuerted into houres, is 2. houres 24. minu. from none when the Sunne is so high as aforesaid.

To finde the Sinus versus of any giuen arch.

Prop. 15.

IF the arch giuen, be lesse then 90. subtract it from 90. and the sine of the remainer taken from the totall sine leaues the sinus versus, but if the giuen arch be greater then 90. deg. subtract 90 degrees there from, and seeke the sine of the remainer, which is alwaies the complement of the ginen arch, which sinus adde to the whole sine, and the totall thereof is the sinus versus of the giuen arch desired.

Example.

To know the sinus versus, of 47. deg, 12. min. the complement thereof is 42. degr. 48. min. whose sine 9794. taken from 10000, the whole sine resteth 3206. the reuersed sine of 47, deg. 12. min.

Likewise to knowe the reuersed sine of 137. degrees 25. minut which is more then 90. deg, taking 90. therefrom, there resteth 47. degrees 25 minutes, the sinus whereof 7363. added to the whole sine, maketh 17363. for the reuersed sine of 137, degrees 25. minutes.

Example.

Running northwest and by north which is 3 from the north 60. leag. or 180. miles, I demaund of longitude? say

If 90. giue 180 what 10000

Facit 100. miles which you are departed from the westward, which if you deuide by the num siuerable to a deg. of Longitude, in the Latitude finde your selfe to be, the quotient giues you the the difference of longitude.

By distance, and departure from the Meri to finde the course. Prop. 13.

As the miles of distance that you haue run tion to the whole sine, so is the miles of your departure from the Meridian to the sine of your course from south or north.

Example.

Being departed from the first meridian 75. miles in the running of 50. leagues, or a 150. miles, I demaund vpon what point I haue sailed, it being betwixt south and west? say

I 150 giue 10000 what 75.

Facit 5000. whose arch 30. degrees is the distance from south towards west that the course is, which is south west and by south southerly.

The Latitude, declination, and height of the Sunne giuen, to knowe the houre of the day.

Proposition. 14.

Adde the complement of the Latitude, and the declination together, and from the sine of the totall, subtract the sine of the Altitude obserued, the remainer is your number first found, which number first found, multiply by the whole sine, and deuide by the sine of the complement of the Latitude, the quotient, whereof is the 2. found number, which second number so knowne as the sine of the complement of the declination is to the totall sine, so is the said second found number to the quotient, which quotient taken from the whole sine, the complement of the arch

to the

to the remainer, is the Sunnes distance from none in degr. and minutes.

Example.

he declination 21. degr. 4. minutes, and the atitude 38. degr. 20. min. added together, utes, the sine thereof 8607. the height of the degrees 30. min. the sine thereof 7490. the former number, leaues 1117. for the first I say,

e 90 what
10000 1117

e second found number, againe say:

iue 90 what
10000 1801

facit 1929. which taken from 10000. leaues 8071. whose arch 53. deg. 49. min. subtracted from 90. leaues 36. degrees 11. min. for the Sunnes distance from the Meridian: that conuerted into houres, is 2. houres 24. minu. from none when the Sunne is so high as aforesaid.

To finde the Sinus versus of any giuen arch.

Prop. 15.

IF the arch giuen, be lesse then 90. subtract it from 90. and the sine of the remainer taken from the totall sine leaues the sinus versus, but if the giuen arch be greater then 90. deg. subtract 90 degrees there from, and seeke the sine of the remainer, which is alwaies the complement of the ginen arch, which sinus adde to the whole sine, and the totall thereof is the sinus versus of the giuen arch desired.

Example.

To know the sinus versus, of 47. deg, 12. min. the complement thereof is 42. degr. 48. min. whose sine 9794. taken from 10000, the whole sine resteth 3206. the reuersed sine of 47, deg. 12. min.

Likewise to knowe the reuersed sine of 137. degrees 25. minut which is more then 90. deg, taking 90. therefrom, there resteth 47. degrees 25 minutes, the sinus whereof 7363. added to the whole sine, maketh 17363. for the reuersed sine of 137, degrees 25. minutes.

# A Table

## The Degrees of the Quadrant.

| mi | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 177 | 352 | 526 | 700 | 874 | 1048 | 1222 | 1395 | 1567 |
| 2 | 6 | 180 | 355 | 529 | 703 | 877 | 1051 | 1224 | 1398 | 1570 |
| 3 | 9 | 183 | 358 | 532 | 706 | 880 | 1054 | 1227 | 1400 | 1573 |
| 4 | 12 | 186 | 361 | 535 | 709 | 883 | 1057 | 1230 | 1403 | 1576 |
| 5 | 14 | 189 | 363 | 538 | 712 | 886 | 1060 | 1233 | 1406 | 1579 |
| 6 | 17 | 192 | 366 | 541 | 715 | 889 | 1063 | 1236 | 1409 | 1582 |
| 7 | 20 | 195 | 369 | 544 | 718 | 892 | 1065 | 1239 | 1412 | 1584 |
| 8 | 23 | 198 | 372 | 547 | 721 | 895 | 1068 | 1242 | 1415 | 1587 |
| 9 | 26 | 201 | 375 | 549 | 724 | 898 | 1071 | 1245 | 1418 | 1590 |
| 10 | 29 | 204 | 378 | 552 | 727 | 900 | 1074 | 1247 | 1421 | 1563 |
| 11 | 32 | 206 | 381 | 555 | 729 | 903 | 1077 | 1250 | 1424 | 1596 |
| 12 | 35 | 209 | 384 | 558 | 732 | 906 | 1080 | 1253 | 1426 | 1599 |
| 13 | 38 | 212 | 387 | 561 | 735 | 909 | 1083 | 1256 | 1429 | 1602 |
| 14 | 41 | 215 | 390 | 564 | 738 | 912 | 1086 | 1259 | 1432 | 1605 |
| 15 | 44 | 218 | 393 | 567 | 741 | 915 | 1089 | 1262 | 1435 | 1608 |
| 16 | 46 | 221 | 395 | 570 | 744 | 918 | 1091 | 1265 | 1438 | 1610 |
| 17 | 49 | 224 | 398 | 573 | 747 | 921 | 1094 | 1268 | 1441 | 1613 |
| 18 | 52 | 227 | 401 | 576 | 750 | 924 | 1097 | 1271 | 1444 | 1616 |
| 19 | 55 | 230 | 404 | 578 | 753 | 927 | 1100 | 1273 | 1446 | 1619 |
| 20 | 58 | 233 | 407 | 581 | 756 | 930 | 1103 | 1276 | 1449 | 1622 |
| 21 | 61 | 235 | 410 | 584 | 758 | 932 | 1106 | 1279 | 1452 | 1625 |
| 22 | 64 | 238 | 413 | 587 | 761 | 935 | 1109 | 1282 | 1455 | 1627 |
| 23 | 67 | 241 | 416 | 590 | 764 | 938 | 1112 | 1285 | 1458 | 1630 |
| 24 | 70 | 244 | 419 | 593 | 767 | 941 | 1115 | 1288 | 1461 | 1633 |
| 25 | 73 | 247 | 422 | 596 | 770 | 944 | 1118 | 1291 | 1464 | 1636 |
| 26 | 76 | 250 | 425 | 599 | 773 | 947 | 1120 | 1294 | 1467 | 1639 |
| 27 | 78 | 253 | 427 | 602 | 776 | 950 | 1123 | 1297 | 1469 | 1642 |
| 28 | 81 | 256 | 430 | 605 | 779 | 953 | 1126 | 1299 | 1472 | 1645 |
| 29 | 84 | 259 | 433 | 608 | 782 | 946 | 1129 | 1302 | 1475 | 1684 |
| 30 | 87 | 262 | 436 | 610 | 785 | 958 | 1132 | 1305 | 1478 | 1650 |

## The Degrees of the Quadrant.

| mi | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 90 | 265 | 439 | 613 | 787 | 961 | 1135 | 1308 | 1481 | 1653 |
| 32 | 93 | 268 | 442 | 616 | 790 | 964 | 1138 | 1311 | 1484 | 1656 |
| 33 | 95 | 270 | 445 | 619 | 793 | 967 | 1141 | 1314 | 1487 | 1659 |
| 34 | 99 | 273 | 448 | 622 | 796 | 970 | 1144 | 1317 | 1490 | 1662 |
| 35 | 102 | 276 | 451 | 625 | 799 | 973 | 1146 | 1320 | 1492 | 1665 |
| 36 | 105 | 279 | 454 | 628 | 802 | 976 | 1149 | 1322 | 1495 | 1668 |
| 37 | 107 | 282 | 456 | 931 | 805 | 979 | 1152 | 1325 | 1498 | 1670 |
| 38 | 110 | 285 | 459 | 634 | 808 | 982 | 1155 | 1328 | 1501 | 1673 |
| 39 | 113 | 288 | 462 | 637 | 811 | 985 | 1158 | 1331 | 1504 | 1676 |
| 40 | 116 | 291 | 465 | 640 | 814 | 987 | 1161 | 1334 | 1507 | 1679 |
| 41 | 119 | 294 | 468 | 642 | 816 | 990 | 1164 | 1337 | 1510 | 1682 |
| 42 | 122 | 297 | 471 | 645 | 819 | 993 | 1167 | 1340 | 1513 | 1685 |
| 43 | 125 | 300 | 474 | 648 | 822 | 996 | 1170 | 1343 | 1515 | 1688 |
| 44 | 128 | 302 | 477 | 651 | 825 | 999 | 1172 | 1346 | 1518 | 1691 |
| 45 | 131 | 305 | 480 | 654 | 828 | 1002 | 1175 | 1348 | 1521 | 1693 |
| 46 | 134 | 308 | 483 | 657 | 831 | 1005 | 1178 | 1351 | 1524 | 1696 |
| 47 | 137 | 311 | 485 | 660 | 834 | 1008 | 1181 | 1354 | 1527 | 1699 |
| 48 | 140 | 314 | 488 | 663 | 837 | 1011 | 1184 | 1357 | 1530 | 1702 |
| 49 | 142 | 317 | 491 | 666 | 840 | 1013 | 1187 | 1360 | 1533 | 1705 |
| 50 | 145 | 320 | 494 | 668 | 843 | 1016 | 1190 | 1363 | 1536 | 1708 |
| 51 | 148 | 323 | 497 | 671 | 845 | 1019 | 1193 | 1366 | 1538 | 1711 |
| 52 | 151 | 326 | 500 | 674 | 848 | 1022 | 1196 | 1369 | 1541 | 1714 |
| 53 | 154 | 329 | 503 | 677 | 851 | 1025 | 1198 | 1372 | 1544 | 1716 |
| 54 | 157 | 331 | 506 | 680 | 854 | 1028 | 1201 | 1374 | 1547 | 1719 |
| 55 | 160 | 334 | 509 | 683 | 857 | 1031 | 1204 | 1377 | 1550 | 1722 |
| 56 | 163 | 337 | 512 | 686 | 860 | 1034 | 1207 | 1380 | 1553 | 1725 |
| 57 | 166 | 340 | 515 | 689 | 863 | 1037 | 1210 | 1383 | 1556 | 1728 |
| 58 | 170 | 343 | 517 | 692 | 866 | 1039 | 1213 | 1386 | 1559 | 1731 |
| 59 | 172 | 347 | 520 | 695 | 869 | 1042 | 1216 | 1389 | 1561 | 1734 |
| 60 | 174 | 350 | 523 | 697 | 871 | 1045 | 1219 | 1392 | 1564 | 1736 |

# A Table

## The Degrees of the Quadrant.

| mi | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1739 | 1911 | 2082 | 2252 | 2422 | 2591 | 2759 | 2926 | 3093 | 3258 |
| 2 | 1742 | 1914 | 2085 | 2255 | 2425 | 2594 | 2762 | 2929 | 3096 | 3261 |
| 3 | 1745 | 1917 | 2088 | 2258 | 2428 | 2597 | 2765 | 2932 | 3098 | 3264 |
| 4 | 1747 | 1919 | 2090 | 2261 | 2430 | 2599 | 2767 | 2935 | 3101 | 3267 |
| 5 | 1750 | 1922 | 2093 | 2264 | 2433 | 2602 | 2770 | 2938 | 3104 | 3269 |
| 6 | 1753 | 1925 | 2096 | 2267 | 2436 | 2605 | 2773 | 2940 | 3107 | 3272 |
| 7 | 1756 | 1928 | 2099 | 2269 | 2439 | 2608 | 2776 | 2943 | 3109 | 2275 |
| 8 | 1759 | 1931 | 2102 | 2272 | 2442 | 2611 | 2779 | 2946 | 3112 | 2278 |
| 9 | 1762 | 1934 | 2105 | 2275 | 2445 | 2613 | 2781 | 2949 | 3115 | 3280 |
| 10 | 1765 | 1937 | 2107 | 2278 | 2447 | 2616 | 2784 | 2951 | 3118 | 3283 |
| 11 | 1767 | 1939 | 2110 | 2281 | 2450 | 2619 | 2787 | 2954 | 3120 | 3286 |
| 12 | 1770 | 1942 | 2113 | 2283 | 2453 | 2622 | 2790 | 2957 | 3123 | 3289 |
| 13 | 1773 | 1945 | 2117 | 2286 | 2456 | 2625 | 2763 | 2960 | 3126 | 3291 |
| 14 | 1776 | 1948 | 2119 | 2289 | 2459 | 2628 | 2795 | 2963 | 3129 | 3294 |
| 15 | 1779 | 1951 | 2122 | 2292 | 2462 | 2630 | 2798 | 2965 | 3132 | 3297 |
| 16 | 1782 | 1954 | 2125 | 2295 | 2464 | 2633 | 2801 | 2968 | 3134 | 3300 |
| 17 | 1785 | 1957 | 2127 | 2298 | 2467 | 2636 | 2804 | 2971 | 3137 | 3302 |
| 18 | 1788 | 1959 | 2130 | 2300 | 2470 | 2639 | 2807 | 2974 | 3140 | 3305 |
| 19 | 1790 | 1962 | 2133 | 2303 | 2473 | 2641 | 2809 | 2976 | 3143 | 3308 |
| 20 | 1793 | 1965 | 2136 | 2306 | 2476 | 2644 | 2812 | 2979 | 3146 | 3311 |
| 21 | 1796 | 1968 | 2139 | 2309 | 2478 | 2647 | 2815 | 2982 | 3148 | 3213 |
| 22 | 1799 | 1971 | 2142 | 2312 | 2481 | 2650 | 2818 | 2985 | 3151 | 3316 |
| 23 | 1802 | 1974 | 2145 | 2315 | 2484 | 2653 | 2821 | 2988 | 3154 | 3319 |
| 24 | 1805 | 1977 | 2147 | 2317 | 2487 | 2655 | 2823 | 2990 | 3156 | 3322 |
| 25 | 1808 | 1979 | 2150 | 2320 | 2490 | 2658 | 2826 | 2993 | 3159 | 3324 |
| 26 | 1810 | 1982 | 2153 | 2323 | 2492 | 2661 | 2829 | 2996 | 3162 | 3327 |
| 27 | 1813 | 1985 | 2156 | 2326 | 2495 | 2664 | 2832 | 2999 | 3165 | 3330 |
| 28 | 1816 | 1988 | 2159 | 2329 | 2498 | 2667 | 2835 | 3001 | 3167 | 3332 |
| 29 | 1819 | 1991 | 3161 | 2331 | 2501 | 2669 | 2837 | 3004 | 3170 | 3335 |
| 30 | 1822 | 1994 | 2164 | 2334 | 2504 | 2672 | 2840 | 3007 | 3173 | 3338 |

## The Degrees of the Quadrant.

| mi | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 1825 | 1996 | 2167 | 2337 | 2507 | 2675 | 2843 | 3010 | 3176 | 3341 |
| 32 | 1828 | 1999 | 2170 | 2340 | 2509 | 2678 | 2846 | 3013 | 3178 | 3343 |
| 23 | 1830 | 2002 | 2173 | 2343 | 2512 | 2681 | 2848 | 3015 | 3181 | 3346 |
| 34 | 1833 | 2005 | 2176 | 2346 | 2515 | 2683 | 2851 | 3018 | 3184 | 3369 |
| 35 | 1836 | 2008 | 2178 | 2349 | 2518 | 2686 | 2854 | 3921 | 3187 | 3352 |
| 36 | 1839 | 2011 | 2181 | 2351 | 2521 | 2689 | 2857 | 3024 | 3189 | 3354 |
| 37 | 1842 | 2014 | 2184 | 2354 | 2524 | 2692 | 2860 | 3026 | 3192 | 3357 |
| 38 | 1845 | 2016 | 2187 | 2357 | 2526 | 2695 | 2862 | 3029 | 3195 | 3360 |
| 39 | 1848 | 2019 | 2190 | 2360 | 2529 | 2698 | 2865 | 3032 | 3198 | 3363 |
| 40 | 1850 | 2522 | 2193 | 2363 | 2532 | 2700 | 2868 | 3035 | 3201 | 3365 |
| 41 | 1853 | 2025 | 2196 | 2365 | 2535 | 2703 | 2871 | 3037 | 3203 | 3368 |
| 42 | 1856 | 2928 | 2198 | 2368 | 2538 | 2706 | 2874 | 3040 | 3206 | 3371 |
| 43 | 1859 | 2031 | 2201 | 2371 | 2540 | 2709 | 2876 | 3043 | 3209 | 3374 |
| 44 | 1862 | 2034 | 2204 | 2374 | 2543 | 2712 | 2879 | 3045 | 3212 | 3376 |
| 45 | 1865 | 2036 | 2207 | 2377 | 2546 | 2714 | 2882 | 3049 | 3214 | 3379 |
| 46 | 1868 | 2039 | 2210 | 2380 | 2549 | 2717 | 2885 | 3051 | 3217 | 3382 |
| 47 | 1870 | 2042 | 2213 | 2382 | 2552 | 2720 | 2887 | 3054 | 3220 | 3385 |
| 48 | 1873 | 2045 | 2216 | 2385 | 2555 | 2723 | 2890 | 3057 | 3223 | 3387 |
| 49 | 1876 | 2048 | 2218 | 2388 | 2557 | 2726 | 2893 | 3060 | 3225 | 3390 |
| 50 | 1879 | 2051 | 2221 | 2391 | 2560 | 2728 | 2896 | 3062 | 3228 | 3393 |
| 51 | 1882 | 2053 | 2224 | 2394 | 2563 | 2731 | 2899 | 3065 | 3231 | 3396 |
| 52 | 1885 | 2056 | 2227 | 2397 | 2566 | 2734 | 2901 | 3068 | 3234 | 3398 |
| 53 | 1888 | 2059 | 2230 | 2399 | 2568 | 2737 | 2904 | 3071 | 3236 | 3401 |
| 54 | 1891 | 2062 | 2232 | 2402 | 2571 | 2740 | 2907 | 3073 | 3239 | 3404 |
| 55 | 1894 | 2065 | 2235 | 2405 | 2574 | 2742 | 2910 | 3076 | 3242 | 3406 |
| 56 | 1896 | 2968 | 2238 | 2409 | 2577 | 2745 | 2913 | 3079 | 3245 | 3409 |
| 57 | 1899 | 2070 | 2241 | 2411 | 2580 | 2748 | 2915 | 3082 | 3247 | 3412 |
| 58 | 1902 | 2073 | 2244 | 2414 | 2583 | 2751 | 2918 | 3085 | 3250 | 3415 |
| 59 | 1905 | 2076 | 2247 | 2416 | 2585 | 2754 | 2521 | 3087 | 3253 | 3417 |
| 60 | 1908 | 2079 | 2249 | 2419 | 2588 | 2756 | 2924 | 3090 | 3256 | 3420 |

# A Table

## The Degrees of the Quadrant.

| mi | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3423 | 3586 | 3749 | 3910 | 4070 | 4229 | 4386 | 4542 | 4697 | 4851 |
| 2 | 3426 | 3589 | 3751 | 3913 | 4073 | 4231 | 4389 | 4545 | 4700 | 4853 |
| 3 | 3428 | 3592 | 3754 | 3915 | 4075 | 4234 | 4391 | 4548 | 4702 | 4856 |
| 4 | 3431 | 3594 | 3757 | 3918 | 4078 | 4237 | 4394 | 4550 | 4705 | 4858 |
| 5 | 3434 | 3597 | 3759 | 3921 | 4081 | 4239 | 4396 | 4553 | 4707 | 4861 |
| 6 | 3437 | 3600 | 3762 | 3923 | 4083 | 4242 | 4399 | 4555 | 4710 | 4863 |
| 7 | 3439 | 3603 | 3765 | 3926 | 4086 | 4245 | 4402 | 4558 | 4713 | 4866 |
| 8 | 3442 | 3605 | 3768 | 3929 | 4089 | 4247 | 4404 | 4561 | 4715 | 4868 |
| 9 | 3445 | 3608 | 3770 | 3931 | 4091 | 4250 | 4407 | 4563 | 4718 | 4871 |
| 10 | 3447 | 3611 | 3773 | 3934 | 4094 | 4252 | 4410 | 4566 | 4720 | 4873 |
| 11 | 3450 | 3613 | 3776 | 3937 | 4096 | 4255 | 4412 | 4568 | 4723 | 4876 |
| 12 | 3453 | 3616 | 3778 | 3939 | 4099 | 4258 | 4415 | 4571 | 4725 | 4878 |
| 13 | 3456 | 3619 | 3781 | 3942 | 4102 | 4260 | 4418 | 4573 | 4728 | 4881 |
| 14 | 3458 | 3622 | 3784 | 3945 | 4104 | 4263 | 4420 | 4576 | 4731 | 4883 |
| 15 | 3461 | 3624 | 3786 | 3947 | 4107 | 4266 | 4423 | 4579 | 4733 | 4886 |
| 16 | 3464 | 3627 | 3789 | 3950 | 4110 | 4268 | 4425 | 4581 | 4736 | 4888 |
| 17 | 3467 | 3630 | 3792 | 3953 | 4112 | 4271 | 4428 | 4584 | 4738 | 4891 |
| 18 | 3469 | 3632 | 3794 | 3955 | 4115 | 4274 | 4431 | 4586 | 4741 | 4893 |
| 19 | 3472 | 3635 | 3797 | 3958 | 4118 | 4276 | 4433 | 4589 | 4743 | 4896 |
| 20 | 3475 | 3638 | 3800 | 3961 | 4120 | 4279 | 4436 | 4592 | 4746 | 4898 |
| 21 | 3477 | 3641 | 3803 | 3963 | 4123 | 4281 | 4438 | 4594 | 4748 | 4901 |
| 22 | 3480 | 3943 | 3805 | 3966 | 4126 | 4284 | 4441 | 4597 | 4751 | 4904 |
| 23 | 3483 | 3646 | 3808 | 3969 | 4128 | 4287 | 4444 | 4599 | 4754 | 4906 |
| 24 | 3486 | 3649 | 3811 | 3971 | 4131 | 4289 | 4446 | 4602 | 4756 | 4909 |
| 25 | 3488 | 3651 | 3813 | 3974 | 4134 | 4292 | 4449 | 4604 | 4759 | 4911 |
| 26 | 3491 | 3654 | 3816 | 3977 | 4136 | 4295 | 4451 | 4607 | 4761 | 4914 |
| 27 | 3494 | 3657 | 3819 | 3979 | 4139 | 4297 | 4454 | 4610 | 4764 | 4916 |
| 28 | 3497 | 3660 | 3821 | 3982 | 4142 | 4300 | 4457 | 4612 | 4766 | 4919 |
| 29 | 3499 | 3662 | 3824 | 3985 | 4144 | 4302 | 4459 | 4615 | 4769 | 4921 |
| 30 | 3502 | 3665 | 3827 | 3987 | 4147 | 4305 | 4462 | 4917 | 4771 | 4924 |

## The Degrees of the Quadrant.

| mi | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 3505 | 3668 | 3829 | 3990 | 4149 | 4308 | 4464 | 4620 | 4774 | 4927 |
| 32 | 3507 | 3670 | 3832 | 3993 | 4152 | 4310 | 4467 | 4623 | 4777 | 4929 |
| 23 | 3510 | 3673 | 3835 | 3995 | 4155 | 4313 | 4470 | 4625 | 4779 | 4932 |
| 34 | 3513 | 3676 | 3837 | 3998 | 4157 | 4316 | 4472 | 4628 | 4782 | 4934 |
| 35 | 3516 | 3679 | 3840 | 4001 | 4160 | 4318 | 4475 | 4630 | 4784 | 4937 |
| 36 | 3518 | 3681 | 3843 | 4003 | 4163 | 4321 | 4478 | 4633 | 4787 | 4939 |
| 37 | 3521 | 3684 | 3846 | 4006 | 4165 | 4324 | 4480 | 4635 | 4789 | 4942 |
| 38 | 3524 | 3687 | 3848 | 4009 | 4168 | 4326 | 4483 | 4138 | 4792 | 4944 |
| 39 | 3527 | 3689 | 3851 | 4011 | 4171 | 4329 | 4485 | 4641 | 4794 | 4947 |
| 40 | 3529 | 3692 | 3854 | 4014 | 4173 | 4331 | 4488 | 4643 | 4797 | 4949 |
| 41 | 3532 | 3695 | 3856 | 4017 | 4176 | 4334 | 4490 | 4646 | 4799 | 4952 |
| 42 | 3535 | 3697 | 3859 | 4019 | 4178 | 4336 | 4493 | 4648 | 4802 | 4954 |
| 43 | 3537 | 3700 | 3862 | 4022 | 4181 | 4338 | 4496 | 4651 | 4805 | 4957 |
| 44 | 3540 | 3703 | 3864 | 4025 | 4184 | 4342 | 4498 | 4653 | 4807 | 4960 |
| 45 | 3543 | 3706 | 3867 | 4028 | 4186 | 4344 | 4501 | 4656 | 4810 | 4962 |
| 46 | 3546 | 3708 | 3870 | 4030 | 4289 | 4347 | 4503 | 4659 | 4812 | 4965 |
| 47 | 3548 | 3711 | 3872 | 4033 | 4192 | 4350 | 4506 | 4661 | 4815 | 4967 |
| 48 | 3551 | 3714 | 3875 | 4035 | 4194 | 4352 | 4509 | 4664 | 4817 | 4970 |
| 49 | 3554 | 3716 | 3878 | 4038 | 4197 | 4355 | 4511 | 4666 | 4820 | 4972 |
| 50 | 3556 | 3719 | 3880 | 4041 | 4200 | 4357 | 4514 | 4669 | 4822 | 4965 |
| 51 | 3559 | 3722 | 3883 | 4043 | 4202 | 4360 | 4516 | 4671 | 4825 | 4977 |
| 52 | 3562 | 3724 | 3886 | 4046 | 4205 | 4363 | 4519 | 4674 | 4828 | 4980 |
| 53 | 3565 | 3727 | 3888 | 4049 | 4208 | 4365 | 4522 | 4677 | 4830 | 4982 |
| 54 | 3567 | 3730 | 3891 | 4051 | 4210 | 4368 | 4524 | 4679 | 4833 | 4985 |
| 55 | 3570 | 3732 | 3894 | 4054 | 4213 | 4371 | 4527 | 4682 | 4835 | 4987 |
| 56 | 3573 | 3735 | 3896 | 4057 | 4216 | 4373 | 4529 | 4684 | 4838 | 4990 |
| 57 | 3575 | 3738 | 3899 | 4059 | 4218 | 4376 | 4532 | 4687 | 4840 | 4992 |
| 58 | 3578 | 3741 | 3902 | 4062 | 4221 | 4378 | 4535 | 4689 | 4843 | 4995 |
| 59 | 3581 | 3743 | 3905 | 4065 | 4224 | 4381 | 4537 | 4692 | 4845 | 4997 |
| 60 | 3584 | 3746 | 3908 | 4067 | 4226 | 4384 | 4540 | 4695 | 4848 | 5000 |

The Degrees of the Quadrant.

| mi. | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 |
|---|---|---|---|---|---|---|---|---|
| 1 | 5002 | 5153 | 5302 | 5449 | 5594 | 5738 | 5880 | 6020 |
| 2 | 5005 | 5155 | 5304 | 5451 | 5597 | 5740 | 5882 | 6023 |
| 3 | 5007 | 5158 | 5306 | 5454 | 5599 | 5743 | 5885 | 6025 |
| 4 | 5010 | 5160 | 5309 | 5456 | 5601 | 5745 | 5887 | 6027 |
| 5 | 5012 | 5163 | 5311 | 5458 | 5604 | 5748 | 5890 | 6030 |
| 6 | 5015 | 5165 | 5314 | 5461 | 5606 | 5750 | 5892 | 6032 |
| 7 | 5017 | 5168 | 5316 | 5463 | 5609 | 5752 | 5894 | 6034 |
| 8 | 5020 | 5170 | 5319 | 5466 | 5611 | 5755 | 5896 | 6037 |
| 9 | 5022 | 5173 | 5321 | 5468 | 5614 | 5757 | 5899 | 6039 |
| 10 | 5025 | 5175 | 5324 | 5471 | 5616 | 5759 | 5901 | 6041 |
| 11 | 5027 | 5178 | 5326 | 5473 | 5618 | 5762 | 5904 | 6044 |
| 12 | 5030 | 5180 | 5329 | 5476 | 5621 | 5764 | 5906 | 6046 |
| 13 | 5032 | 5183 | 5331 | 5478 | 5623 | 5767 | 5908 | 6048 |
| 14 | 5025 | 5185 | | | | | | |

## The Latitude, declination, and height of the Sunne giuen, to knowe the houre of the day.

### Proposition. 14.

ADde the complement of the Latitude, and the declination together, and from the sine of the totall, subtract the sine of the Altitude obserued, the remainer is your number first found, which number first found, multiply by the whole sine, and deuide by the sine of the complement of the Latitude, the quotient, whereof is the 2. found number, which second number so knowne as the sine of the complement of the declination is to the totall sine, so is the said second found number to the quotient, which quotient taken from the whole sine, the complement of the arch

to the

## The Degrees of the Quadrant.

| mi | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 |
|---|---|---|---|---|---|---|---|---|
| 31 | 5078 | 5227 | 5375 | 5522 | 5666 | 5809 | 5950 | 6090 |
| 32 | 5080 | 5230 | 5378 | 5524 | 5669 | 5812 | 5953 | 6092 |
| 33 | 5083 | 5232 | 5380 | 5527 | 5671 | 5814 | 5955 | 9094 |
| 34 | 5085 | 5235 | 5383 | 5529 | 5674 | 5816 | 5957 | 6097 |
| 35 | 5088 | 5237 | 5385 | 5531 | 5676 | 5819 | 5960 | 6099 |
| 36 | 5090 | 5240 | 5388 | 5534 | 5678 | 5821 | 5962 | 6101 |
| 37 | 5093 | 5242 | 5390 | 5536 | 5681 | 5823 | 5964 | 6104 |
| 38 | 5095 | 5245 | 5393 | 5539 | 5683 | 5826 | 5967 | 6106 |
| 39 | 5098 | 5247 | 5395 | 5541 | 5685 | 5828 | 5969 | 6108 |
| 40 | 5100 | 5250 | 5397 | 5543 | 5688 | 5831 | 5971 | 6111 |
| 41 | 5103 | 5252 | 5400 | 5546 | 5690 | 5833 | 5974 | 6113 |
| 42 | 5105 | 5255 | 5402 | 5548 | 5693 | 5835 | 7976 | 6115 |
| 43 | 5108 | 5257 | 5404 | 5551 | 5695 | 5838 | 5978 | 6118 |

degrees there from, and take the line of the residue, which is alwaies the complement of the given arch, which sinus adde to the whole sine, and the totall thereof is the sinus versus of the given arch desired.

Example.

To know the sinus versus, of 47. deg, 12. min. the complement thereof is 42. degr 48. min. whose sine 9794. taken from 10000, the whole sine resteth 3206. the reuersed sine of 47, deg. 12. min.

Likewise to knowe the reuersed sine of 137. degrees 25. minut which is more then 90. deg, taking 90. therefrom, there resteth 47. degrees 25 minutes, the sinus whereof 7363. added to the whole sine, maketh 17363. for the reuersed sine of 137, degrees 25. minutes.

# A Table

## The Degrees of the Quadrant.

| mi | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | 177 | 352 | 526 | 700 | 874 | 1048 | 1222 | 1395 | 1567 |
| 2 | 6 | 180 | 355 | 529 | 703 | 877 | 1051 | 1224 | 1398 | 1570 |
| 3 | 9 | 183 | 358 | 532 | 706 | 880 | 1054 | 1227 | 1400 | 1573 |
| 4 | 12 | 186 | 361 | 535 | 709 | 883 | 1057 | 1230 | 1403 | 1576 |
| 5 | 14 | 189 | 363 | 538 | 712 | 886 | 1060 | 1233 | 1406 | 1579 |
| 6 | 17 | 192 | 366 | 541 | 715 | 889 | 1063 | 1236 | 1409 | 1582 |
| 7 | 20 | 195 | 369 | 544 | 718 | 892 | 1065 | 1239 | 1412 | 1584 |
| 8 | 23 | 198 | 372 | 547 | 721 | 895 | 1068 | 1242 | 1415 | 1587 |
| 9 | 26 | 201 | 375 | 549 | 724 | 898 | 1071 | 1245 | 1418 | 1590 |
| 10 | 29 | 204 | 378 | 552 | 727 | 900 | 1074 | 1247 | 1421 | 1563 |
| 11 | 32 | 206 | 381 | 555 | 729 | 903 | 1077 | 1250 | 1424 | 1596 |
| 12 | 35 | 209 | 384 | 558 | 732 | 906 | 1080 | 1253 | 1426 | 1599 |
| 13 | 38 | 212 | 387 | 561 | 735 | 909 | 1083 | 1256 | 1429 | 1602 |
| 14 | 41 | 215 | 390 | 564 | 738 | 912 | 1086 | 1259 | 1432 | 1605 |
| 15 | 44 | 218 | 393 | 567 | 741 | 915 | 1089 | 1262 | 1435 | 1608 |
| 16 | 46 | 221 | 395 | 570 | 744 | 918 | 1091 | 1265 | 1438 | 1610 |
| 17 | 49 | 224 | 398 | 573 | 747 | 921 | 1094 | 1268 | 1441 | 1613 |
| 18 | 52 | 227 | 401 | 576 | 750 | 924 | 1097 | 1271 | 1444 | 1616 |
| 19 | 55 | 230 | 404 | 578 | 753 | 927 | 1100 | 1273 | 1446 | 1619 |
| 20 | 58 | 233 | 407 | 581 | 756 | 930 | 1103 | 1276 | 1449 | 1622 |
| 21 | 61 | 235 | 410 | 584 | 758 | 932 | 1106 | 1279 | 1452 | 1625 |
| 22 | 64 | 238 | 413 | 587 | 761 | 935 | 1109 | 1282 | 1455 | 1627 |
| 23 | 67 | 241 | 416 | 590 | 764 | 938 | 1112 | 1285 | 1458 | 1630 |
| 24 | 70 | 244 | 419 | 593 | 767 | 941 | 1115 | 1288 | 1461 | 1633 |
| 25 | 73 | 247 | 422 | 596 | 770 | 944 | 1118 | 1291 | 1464 | 1636 |
| 26 | 76 | 250 | 425 | 599 | 773 | 947 | 1120 | 1294 | 1467 | 1639 |
| 27 | 78 | 253 | 427 | 602 | 776 | 950 | 1123 | 1297 | 1469 | 1642 |
| 28 | 81 | 256 | 430 | 605 | 779 | 953 | 1126 | 1299 | 1472 | 1645 |
| 29 | 84 | 259 | 433 | 608 | 782 | 946 | 1129 | 1302 | 1475 | 1684 |
| 30 | 87 | 262 | 436 | 610 | 785 | 958 | 1132 | 1305 | 1478 | 1650 |

## The Degrees of the Quadrant.

| mi | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 90 | 265 | 439 | 613 | 787 | 961 | 1135 | 1308 | 1481 | 1653 |
| 32 | 93 | 268 | 442 | 616 | 790 | 964 | 1138 | 1311 | 1484 | 1656 |
| 33 | 95 | 270 | 445 | 619 | 793 | 967 | 1141 | 1314 | 1487 | 1659 |
| 34 | 99 | 273 | 448 | 622 | 796 | 970 | 1144 | 1317 | 1490 | 1662 |
| 35 | 102 | 276 | 451 | 625 | 799 | 973 | 1146 | 1320 | 1492 | 1665 |
| 36 | 105 | 279 | 454 | 628 | 802 | 976 | 1149 | 1322 | 1495 | 1668 |
| 37 | 107 | 282 | 456 | 931 | 805 | 979 | 1152 | 1325 | 1498 | 1670 |
| 38 | 110 | 285 | 459 | 634 | 808 | 982 | 1155 | 1328 | 1501 | 1673 |
| 39 | 113 | 288 | 462 | 637 | 811 | 985 | 1158 | 1331 | 1504 | 1676 |
| 40 | 116 | 291 | 465 | 640 | 814 | 987 | 1161 | 1334 | 1507 | 1679 |
| 41 | 119 | 294 | 468 | 642 | 816 | 990 | 1164 | 1337 | 1510 | 1682 |
| 42 | 122 | 297 | 471 | 645 | 819 | 993 | 1167 | 1340 | 1513 | 1685 |
| 43 | 125 | 300 | 474 | 648 | 822 | 996 | 1170 | 1343 | 1515 | 1688 |
| 44 | 128 | 302 | 477 | 651 | 825 | 999 | 1172 | 1346 | 1518 | 1691 |
| 45 | 131 | 305 | 480 | 654 | 828 | 1002 | 1175 | 1348 | 1521 | 1693 |
| 46 | 134 | 308 | 483 | 657 | 831 | 1005 | 1178 | 1351 | 1524 | 1696 |
| 47 | 137 | 311 | 485 | 660 | 834 | 1008 | 1181 | 1354 | 1527 | 1699 |
| 48 | 140 | 314 | 488 | 663 | 837 | 1011 | 1184 | 1357 | 1530 | 1702 |
| 49 | 142 | 317 | 491 | 666 | 840 | 1013 | 1187 | 1360 | 1533 | 1705 |
| 50 | 145 | 320 | 494 | 668 | 843 | 1016 | 1190 | 1363 | 1536 | 1708 |
| 51 | 148 | 323 | 497 | 671 | 845 | 1019 | 1193 | 1366 | 1538 | 1711 |
| 52 | 151 | 326 | 500 | 674 | 848 | 1022 | 1196 | 1369 | 1541 | 1714 |
| 53 | 154 | 329 | 503 | 677 | 851 | 1025 | 1198 | 1372 | 1544 | 1716 |
| 54 | 157 | 331 | 506 | 680 | 854 | 1028 | 1201 | 1374 | 1547 | 1719 |
| 55 | 160 | 334 | 509 | 683 | 857 | 1031 | 1204 | 1377 | 1550 | 1722 |
| 56 | 163 | 337 | 512 | 686 | 860 | 1034 | 1207 | 1380 | 1553 | 1725 |
| 57 | 166 | 340 | 515 | 689 | 863 | 1037 | 1210 | 1383 | 1556 | 1728 |
| 58 | 170 | 343 | 517 | 692 | 866 | 1039 | 1213 | 1386 | 1559 | 1731 |
| 59 | 172 | 347 | 520 | 695 | 869 | 1042 | 1216 | 1389 | 1561 | 1734 |
| 60 | 174 | 350 | 523 | 697 | 871 | 1045 | 1219 | 1392 | 1564 | 1736 |

# A Table

## The Degrees of the Quadrant.

| mi | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1739 | 1911 | 2082 | 2252 | 2422 | 2591 | 2759 | 2926 | 3093 | 3258 |
| 2 | 1742 | 1914 | 2085 | 2255 | 2425 | 2594 | 2762 | 2929 | 3096 | 3261 |
| 3 | 1745 | 1917 | 2088 | 2258 | 2428 | 2597 | 2765 | 2932 | 3098 | 3264 |
| 4 | 1747 | 1919 | 2090 | 2261 | 2430 | 2599 | 2767 | 2935 | 3101 | 3267 |
| 5 | 1750 | 1922 | 2093 | 2264 | 2433 | 2602 | 2770 | 2938 | 3104 | 3269 |
| 6 | 1753 | 1925 | 2096 | 2267 | 2436 | 2605 | 2773 | 2940 | 3107 | 3272 |
| 7 | 1756 | 1928 | 2099 | 2269 | 2439 | 2608 | 2776 | 2943 | 3109 | 2275 |
| 8 | 1759 | 1931 | 2102 | 2272 | 2442 | 2611 | 2779 | 2946 | 3112 | 2278 |
| 9 | 1762 | 1934 | 2105 | 2275 | 2445 | 2613 | 2781 | 2949 | 3115 | 3280 |
| 10 | 1765 | 1937 | 2107 | 2278 | 2447 | 2616 | 2784 | 2951 | 3118 | 3283 |
| 11 | 1767 | 1939 | 2110 | 2281 | 2450 | 2619 | 2787 | 2954 | 3120 | 3286 |
| 12 | 1770 | 1942 | 2113 | 2283 | 2453 | 2622 | 2790 | 2957 | 3123 | 3289 |
| 13 | 1773 | 1945 | 2117 | 2286 | 2456 | 2625 | 2763 | 2960 | 3126 | 3291 |
| 14 | 1776 | 1948 | 2119 | 2289 | 2459 | 2628 | 2795 | 2963 | 3129 | 3294 |
| 15 | 1779 | 1951 | 2122 | 2292 | 2462 | 2630 | 2798 | 2965 | 3132 | 3297 |
| 16 | 1782 | 1954 | 2125 | 2295 | 2464 | 2633 | 2801 | 2968 | 3134 | 3300 |
| 17 | 1785 | 1957 | 2127 | 2298 | 2467 | 2636 | 2804 | 2971 | 3137 | 3302 |
| 18 | 1788 | 1959 | 2130 | 2300 | 2470 | 2639 | 2807 | 2974 | 3140 | 3305 |
| 19 | 1790 | 1962 | 2133 | 2303 | 2473 | 2641 | 2809 | 2976 | 3143 | 3308 |
| 20 | 1793 | 1965 | 2136 | 2306 | 2476 | 2644 | 2812 | 2979 | 3146 | 3311 |
| 21 | 1796 | 1968 | 2139 | 2309 | 2478 | 2647 | 2815 | 2982 | 3148 | 3213 |
| 22 | 1799 | 1971 | 2142 | 2312 | 2481 | 2650 | 2818 | 2985 | 3151 | 3316 |
| 23 | 1802 | 1974 | 2145 | 2315 | 2484 | 2653 | 2821 | 2988 | 3154 | 3319 |
| 24 | 1805 | 1977 | 2147 | 2317 | 2487 | 2655 | 2823 | 2990 | 3156 | 3322 |
| 25 | 1808 | 1979 | 2150 | 2320 | 2490 | 2658 | 2826 | 2993 | 3159 | 3324 |
| 26 | 1810 | 1982 | 2153 | 2323 | 2492 | 2661 | 2829 | 2996 | 3162 | 3327 |
| 27 | 1813 | 1985 | 2156 | 2326 | 2495 | 2664 | 2832 | 2999 | 3165 | 3330 |
| 28 | 1816 | 1988 | 2159 | 2329 | 2498 | 2667 | 2835 | 3001 | 3167 | 3332 |
| 29 | 1819 | 1991 | 3161 | 2331 | 2501 | 2669 | 2837 | 3004 | 3170 | 3335 |
| 30 | 1822 | 1994 | 2164 | 2334 | 2504 | 2672 | 2840 | 3007 | 3173 | 3338 |

## The Degrees of the Quadrant.

| mi | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 1825 | 1996 | 2167 | 2337 | 2507 | 2675 | 2843 | 3010 | 3176 | 3341 |
| 32 | 1828 | 1999 | 2170 | 2340 | 2509 | 2678 | 2846 | 3013 | 3178 | 3343 |
| 23 | 1830 | 2002 | 2173 | 2343 | 2512 | 2681 | 2848 | 3015 | 3181 | 3346 |
| 34 | 1833 | 2005 | 2176 | 2346 | 2515 | 2683 | 2851 | 3018 | 3184 | 3369 |
| 35 | 1836 | 2008 | 2178 | 2349 | 2518 | 2686 | 2854 | 3921 | 3187 | 3352 |
| 36 | 1839 | 2011 | 2181 | 2351 | 2521 | 2689 | 2857 | 3024 | 3189 | 3354 |
| 37 | 1842 | 2014 | 2184 | 2354 | 2524 | 2692 | 2860 | 3026 | 3192 | 3357 |
| 38 | 1845 | 2016 | 2187 | 2357 | 2526 | 2695 | 2862 | 3029 | 3195 | 3360 |
| 39 | 1848 | 2019 | 2190 | 2360 | 2529 | 2698 | 2865 | 3032 | 3198 | 3363 |
| 40 | 1850 | 2522 | 2193 | 2363 | 2532 | 2700 | 2868 | 3035 | 3201 | 3365 |
| 41 | 1853 | 2025 | 2196 | 2365 | 2535 | 2703 | 2871 | 3037 | 3203 | 3368 |
| 42 | 1856 | 2928 | 2198 | 2368 | 2538 | 2706 | 2874 | 3040 | 3206 | 3371 |
| 43 | 1859 | 2031 | 2201 | 2371 | 2540 | 2709 | 2876 | 3043 | 3209 | 3374 |
| 44 | 1862 | 2034 | 2204 | 2374 | 2543 | 2712 | 2879 | 3046 | 3212 | 3376 |
| 45 | 1865 | 2036 | 2207 | 2377 | 2546 | 2714 | 2882 | 3049 | 3214 | 3379 |
| 46 | 1868 | 2039 | 2210 | 2380 | 2549 | 2717 | 2885 | 3051 | 3217 | 3382 |
| 47 | 1870 | 2042 | 2213 | 2382 | 2552 | 2720 | 2887 | 3054 | 3220 | 3385 |
| 48 | 1873 | 2045 | 2216 | 2385 | 2555 | 2723 | 2890 | 3057 | 3223 | 3387 |
| 49 | 1876 | 2048 | 2218 | 2388 | 2557 | 2726 | 2893 | 3060 | 3225 | 3390 |
| 50 | 1879 | 2051 | 2221 | 2391 | 2560 | 2728 | 2896 | 3062 | 3228 | 3393 |
| 51 | 1882 | 2053 | 2224 | 2394 | 2563 | 2731 | 2899 | 3065 | 3231 | 3396 |
| 52 | 1885 | 2056 | 2227 | 2397 | 2566 | 2734 | 2901 | 3068 | 3234 | 3398 |
| 53 | 1888 | 2059 | 2230 | 2399 | 2568 | 2737 | 2904 | 3071 | 3236 | 3401 |
| 54 | 1891 | 2062 | 2232 | 2402 | 2571 | 2740 | 2907 | 3073 | 3239 | 3404 |
| 55 | 1894 | 2065 | 2235 | 2405 | 2574 | 2742 | 2910 | 3076 | 3242 | 3406 |
| 56 | 1896 | 2968 | 2238 | 2409 | 2577 | 2745 | 2913 | 3079 | 3245 | 3409 |
| 57 | 1899 | 2070 | 2241 | 2411 | 2580 | 2748 | 2915 | 3082 | 3247 | 3412 |
| 58 | 1902 | 2073 | 2244 | 2414 | 2583 | 2751 | 2918 | 3085 | 3250 | 3415 |
| 59 | 1905 | 2076 | 2247 | 2416 | 2585 | 2754 | 2521 | 3087 | 3253 | 3417 |
| 60 | 1908 | 2079 | 2249 | 2419 | 2588 | 2756 | 2924 | 3090 | 3256 | 3420 |

# A Table

## The Degrees of the Quadrant.

| m | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3423 | 3586 | 3749 | 3910 | 4070 | 4229 | 4386 | 4542 | 4697 | 4851 |
| 2 | 3426 | 3589 | 3751 | 3913 | 4073 | 4231 | 4389 | 4545 | 4700 | 4853 |
| 3 | 3428 | 3592 | 3754 | 3915 | 4075 | 4234 | 4391 | 4548 | 4702 | 4856 |
| 4 | 3431 | 3594 | 3757 | 3918 | 4078 | 4237 | 4394 | 4550 | 4705 | 4858 |
| 5 | 3434 | 3597 | 3759 | 3921 | 4081 | 4239 | 4396 | 4553 | 4707 | 4861 |
| 6 | 3437 | 3600 | 3762 | 3923 | 4083 | 4242 | 4399 | 4555 | 4710 | 4863 |
| 7 | 3439 | 3603 | 3765 | 3926 | 4086 | 4245 | 4402 | 4558 | 4713 | 4866 |
| 8 | 3442 | 3605 | 3768 | 3929 | 4089 | 4247 | 4404 | 4561 | 4715 | 4868 |
| 9 | 3445 | 3608 | 3770 | 3931 | 4091 | 4250 | 4407 | 4563 | 4718 | 4871 |
| 10 | 3447 | 3611 | 3773 | 3934 | 4094 | 4252 | 4410 | 4566 | 4720 | 4873 |
| 11 | 3450 | 3613 | 3776 | 3937 | 4096 | 4255 | 4412 | 4568 | 4723 | 4876 |
| 12 | 3453 | 3616 | 3778 | 3939 | 4099 | 4258 | 4415 | 4571 | 4725 | 4878 |
| 13 | 3456 | 3619 | 3781 | 3942 | 4102 | 4260 | 4418 | 4573 | 4728 | 4881 |
| 14 | 3458 | 3622 | 3784 | 3945 | 4104 | 4263 | 4420 | 4576 | 4731 | 4883 |
| 15 | 3461 | 3624 | 3786 | 3947 | 4107 | 4266 | 4423 | 4579 | 4733 | 4886 |
| 16 | 3464 | 3627 | 3789 | 3950 | 4110 | 4268 | 4425 | 4581 | 4736 | 4888 |
| 17 | 3467 | 3630 | 3792 | 3953 | 4112 | 4271 | 4428 | 4584 | 4738 | 4891 |
| 18 | 3469 | 3632 | 3794 | 3955 | 4115 | 4274 | 4431 | 4586 | 4741 | 4893 |
| 19 | 3472 | 3635 | 3797 | 3958 | 4118 | 4276 | 4433 | 4589 | 4743 | 4896 |
| 20 | 3475 | 3638 | 3800 | 3961 | 4120 | 4279 | 4436 | 4592 | 4746 | 4898 |
| 21 | 3477 | 3641 | 3803 | 3963 | 4123 | 4281 | 4438 | 4594 | 4748 | 4901 |
| 22 | 3480 | 3943 | 3805 | 3966 | 4126 | 4284 | 4441 | 4597 | 4751 | 4904 |
| 23 | 3483 | 3646 | 3808 | 3969 | 4128 | 4287 | 4444 | 4599 | 4754 | 4906 |
| 24 | 3486 | 3649 | 3811 | 3971 | 4131 | 4289 | 4446 | 4602 | 4756 | 4909 |
| 25 | 3488 | 3651 | 3813 | 3974 | 4134 | 4292 | 4449 | 4604 | 4759 | 4911 |
| 26 | 3491 | 3654 | 3816 | 3977 | 4136 | 4295 | 4451 | 4607 | 4761 | 4914 |
| 27 | 3494 | 3657 | 3819 | 3979 | 4139 | 4297 | 4454 | 4610 | 4764 | 4916 |
| 28 | 3497 | 3660 | 3821 | 3982 | 4142 | 4300 | 4457 | 4612 | 4766 | 4919 |
| 29 | 3499 | 3662 | 3824 | 3985 | 4144 | 4302 | 4459 | 4615 | 4769 | 4921 |
| 30 | 3502 | 3665 | 3827 | 3987 | 4147 | 4305 | 4462 | 4917 | 4771 | 4924 |

## The Degrees of the Quadrant.

| mi | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 3505 | 3668 | 3829 | 3990 | 4149 | 4308 | 4464 | 4620 | 4774 | 4927 |
| 32 | 3507 | 3670 | 3832 | 3993 | 4152 | 4310 | 4467 | 4623 | 4777 | 4929 |
| 23 | 3510 | 3673 | 3835 | 3995 | 4155 | 4313 | 4470 | 4625 | 4779 | 4932 |
| 34 | 3513 | 3676 | 3837 | 3998 | 4157 | 4316 | 4472 | 4628 | 4782 | 4934 |
| 35 | 3516 | 3679 | 3840 | 4001 | 4160 | 4318 | 4475 | 4630 | 4784 | 4937 |
| 36 | 3518 | 3681 | 3843 | 4003 | 4163 | 4321 | 4478 | 4633 | 4787 | 4939 |
| 37 | 3521 | 3684 | 3846 | 4006 | 4165 | 4324 | 4480 | 4635 | 4789 | 4942 |
| 38 | 3524 | 3687 | 3848 | 4009 | 4168 | 4326 | 4483 | 4138 | 4792 | 4944 |
| 39 | 3527 | 3689 | 3851 | 4011 | 4171 | 4329 | 4485 | 4641 | 4794 | 4947 |
| 40 | 3529 | 3692 | 3854 | 4014 | 4173 | 4331 | 4488 | 4643 | 4797 | 4949 |
| 41 | 3532 | 3695 | 3856 | 4017 | 4176 | 4334 | 4490 | 4646 | 4799 | 4952 |
| 42 | 3535 | 3697 | 3859 | 4019 | 4178 | 4336 | 4493 | 4648 | 4802 | 4954 |
| 43 | 3537 | 3700 | 3862 | 4022 | 4181 | 4338 | 4496 | 4651 | 4805 | 4957 |
| 44 | 3540 | 3703 | 3864 | 4025 | 4184 | 4342 | 4498 | 4653 | 4807 | 4960 |
| 45 | 3543 | 3706 | 3867 | 4028 | 4186 | 4344 | 4501 | 4656 | 4810 | 4962 |
| 46 | 3546 | 3708 | 3870 | 4030 | 4289 | 4347 | 4503 | 4659 | 4812 | 4965 |
| 47 | 3548 | 3711 | 3872 | 4033 | 4192 | 4350 | 4506 | 4661 | 4815 | 4967 |
| 48 | 3551 | 3714 | 3875 | 4035 | 4194 | 4352 | 4509 | 4664 | 4817 | 4970 |
| 49 | 3554 | 3716 | 3878 | 4038 | 4197 | 4355 | 4511 | 4666 | 4820 | 4972 |
| 50 | 3556 | 3719 | 3880 | 4041 | 4200 | 4357 | 4514 | 4669 | 4822 | 4965 |
| 51 | 3559 | 3722 | 3883 | 4043 | 4202 | 4360 | 4516 | 4671 | 4825 | 4977 |
| 52 | 3562 | 3724 | 3886 | 4046 | 4205 | 4363 | 4519 | 4674 | 4828 | 4980 |
| 53 | 3565 | 3727 | 3888 | 4049 | 4208 | 4365 | 4522 | 4677 | 4830 | 4982 |
| 54 | 3567 | 3730 | 3891 | 4051 | 4210 | 4368 | 4524 | 4679 | 4833 | 4985 |
| 55 | 3570 | 3732 | 3894 | 4054 | 4213 | 4371 | 4527 | 4682 | 4835 | 4987 |
| 56 | 3573 | 3735 | 3896 | 4057 | 4216 | 4373 | 4529 | 4684 | 4838 | 4990 |
| 57 | 3575 | 3738 | 3899 | 4059 | 4218 | 4376 | 4532 | 4687 | 4840 | 4992 |
| 58 | 3578 | 3741 | 3902 | 4062 | 4221 | 4378 | 4535 | 4689 | 4843 | 4995 |
| 59 | 3581 | 3743 | 3905 | 4065 | 4224 | 4381 | 4537 | 4692 | 4845 | 4997 |
| 60 | 3584 | 3746 | 3908 | 4067 | 4226 | 4384 | 4540 | 4695 | 4848 | 5000 |

# A Table

## The Degrees of the Quadrant.

| mi. | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 |
|---|---|---|---|---|---|---|---|---|
| 1 | 5002 | 5153 | 5302 | 5449 | 5594 | 5738 | 5880 | 6020 |
| 2 | 5005 | 5155 | 5304 | 5451 | 5597 | 5740 | 5882 | 6023 |
| 3 | 5007 | 5158 | 5306 | 5454 | 5599 | 5743 | 5885 | 6025 |
| 4 | 5010 | 5160 | 5309 | 5456 | 5601 | 5745 | 5887 | 6027 |
| 5 | 5012 | 5163 | 5311 | 5458 | 5604 | 5748 | 5890 | 6030 |
| 6 | 5015 | 5165 | 5314 | 5461 | 5606 | 5750 | 5892 | 6032 |
| 7 | 5017 | 5168 | 5316 | 5463 | 5609 | 5752 | 5894 | 6034 |
| 8 | 5020 | 5170 | 5319 | 5466 | 5611 | 5755 | 5896 | 6037 |
| 9 | 5022 | 5173 | 5321 | 5468 | 5614 | 5757 | 5899 | 6039 |
| 10 | 5025 | 5175 | 5324 | 5471 | 5616 | 5759 | 5901 | 6041 |
| 11 | 5027 | 5178 | 5326 | 5473 | 5618 | 5762 | 5904 | 6044 |
| 12 | 5030 | 5180 | 5329 | 5476 | 5621 | 5764 | 5906 | 6046 |
| 13 | 5032 | 5183 | 5331 | 5478 | 5623 | 5767 | 5908 | 6048 |
| 14 | 5035 | 5185 | 5334 | 5480 | 5625 | 5769 | 5911 | 6051 |
| 15 | 5037 | 5188 | 5336 | 5483 | 5628 | 5771 | 5913 | 6053 |
| 16 | 5040 | 5190 | 4339 | 5485 | 5630 | 5774 | 5915 | 6055 |
| 17 | 5042 | 5193 | 5341 | 5488 | 5633 | 5776 | 5918 | 6057 |
| 18 | 5045 | 5195 | 5343 | 5490 | 5635 | 5778 | 5620 | 6060 |
| 19 | 5048 | 5198 | 5346 | 5493 | 5638 | 5781 | 5922 | 6062 |
| 20 | 5050 | 5200 | 5348 | 5495 | 5640 | 5783 | 5925 | 6064 |
| 21 | 5053 | 5203 | 5351 | 5497 | 5642 | 5785 | 5927 | 6067 |
| 22 | 5055 | 5205 | 5353 | 5500 | 5645 | 5788 | 5929 | 6069 |
| 23 | 5058 | 5208 | 5356 | 5502 | 5647 | 5790 | 5932 | 6071 |
| 24 | 5060 | 5210 | 5358 | 5505 | 5650 | 5793 | 5934 | 6074 |
| 25 | 5063 | 5212 | 5361 | 5507 | 5652 | 5795 | 5936 | 6076 |
| 26 | 5065 | 5215 | 5363 | 5509 | 5654 | 5797 | 5939 | 6078 |
| 27 | 5068 | 5217 | 5366 | 5512 | 5657 | 5800 | 5941 | 7081 |
| 28 | 5070 | 5220 | 5368 | 5514 | 5659 | 5802 | 5943 | 6083 |
| 29 | 5073 | 5222 | 5370 | 5517 | 5662 | 5805 | 5946 | 6085 |
| 30 | 5075 | 5225 | 5373 | 5519 | 5664 | 5807 | 5938 | 6088 |

## The Degrees of the Quadrant.

| mi | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 |
|---|---|---|---|---|---|---|---|---|
| 31 | 5078 | 5227 | 5375 | 5522 | 5666 | 5809 | 5950 | 6090 |
| 32 | 5080 | 5230 | 5378 | 5524 | 5669 | 5812 | 5953 | 6092 |
| 33 | 5083 | 5232 | 5380 | 5527 | 5671 | 5814 | 5955 | 9094 |
| 34 | 5085 | 5235 | 5383 | 5529 | 5674 | 5816 | 5957 | 6097 |
| 35 | 5088 | 5237 | 5385 | 5531 | 5676 | 5819 | 5960 | 6099 |
| 36 | 5090 | 5240 | 5388 | 5534 | 5678 | 5821 | 5962 | 6101 |
| 37 | 5093 | 5242 | 5390 | 5536 | 5681 | 5823 | 5964 | 6104 |
| 38 | 5095 | 5245 | 5393 | 5539 | 5683 | 5826 | 5967 | 6106 |
| 39 | 5098 | 5247 | 5395 | 5541 | 5685 | 5828 | 5969 | 6108 |
| 40 | 5100 | 5250 | 5397 | 5543 | 5688 | 5831 | 5971 | 6111 |
| 41 | 5103 | 5252 | 5400 | 5546 | 5690 | 5833 | 5974 | 6113 |
| 42 | 5105 | 5255 | 5402 | 5548 | 5693 | 5835 | 7976 | 6115 |
| 43 | 5108 | 5257 | 5404 | 5551 | 5695 | 5838 | 5978 | 6117 |
| 44 | 5110 | 5260 | 5407 | 5553 | 5697 | 5840 | 5981 | 6120 |
| 45 | 5113 | 5262 | 5410 | 5556 | 5700 | 5842 | 5983 | 6122 |
| 46 | 5115 | 5265 | 5412 | 5558 | 5702 | 5845 | 5985 | 6124 |
| 47 | 5118 | 5267 | 5415 | 5560 | 5705 | 5847 | 5988 | 6127 |
| 48 | 5120 | 5269 | 5417 | 5563 | 5707 | 5849 | 5990 | 6129 |
| 49 | 5123 | 5272 | 5419 | 5565 | 5709 | 5852 | 5992 | 6131 |
| 50 | 7127 | 5274 | 5422 | 5568 | 5712 | 5854 | 5995 | 6134 |
| 51 | 5128 | 5277 | 5424 | 5570 | 5714 | 5856 | 5997 | 6136 |
| 52 | 5130 | 5279 | 5427 | 5573 | 5717 | 5859 | 5999 | 6138 |
| 53 | 5133 | 5282 | 5429 | 5575 | 5719 | 5861 | 6002 | 6140 |
| 54 | 5135 | 5284 | 5432 | 5577 | 5721 | 5864 | 6004 | 6143 |
| 55 | 5138 | 5287 | 5434 | 5580 | 5724 | 5866 | 6006 | 6145 |
| 56 | 5140 | 5289 | 5437 | 5582 | 5726 | 5868 | 6009 | 6147 |
| 57 | 5143 | 5292 | 5439 | 5585 | 5729 | 5871 | 6011 | 6149 |
| 58 | 5445 | 5294 | 5441 | 5587 | 5731 | 5873 | 6013 | 6152 |
| 59 | 5148 | 5297 | 5444 | 5589 | 5733 | 5875 | 6016 | 6154 |
| 60 | 5150 | 5299 | 5446 | 5592 | 5736 | 5878 | 6018 | 6156 |

# A Table

## The Degrees of the Quadrant.

| mi. | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
|---|---|---|---|---|---|---|---|---|
| 1 | 6159 | 6295 | 6430 | 6563 | 6694 | 6822 | 6949 | 7073 |
| 2 | 6161 | 6298 | 6432 | 6565 | 6696 | 6824 | 6951 | 7075 |
| 3 | 6163 | 6300 | 6434 | 6567 | 6698 | 6826 | 6953 | 7077 |
| 4 | 6166 | 6302 | 6437 | 6569 | 6700 | 6828 | 6955 | 7079 |
| 5 | 6168 | 6304 | 6439 | 6571 | 6702 | 6831 | 6957 | 7081 |
| 6 | 6170 | 6307 | 6441 | 6574 | 6704 | 6833 | 6959 | 7083 |
| 7 | 6173 | 6309 | 6443 | 6576 | 6706 | 6835 | 6961 | 7085 |
| 8 | 6175 | 6311 | 6446 | 6578 | 6708 | 6837 | 6963 | 7087 |
| 9 | 6177 | 6313 | 6448 | 6580 | 6711 | 6839 | 6965 | 7089 |
| 10 | 6179 | 6316 | 6450 | 6582 | 6713 | 6841 | 6967 | 7092 |
| 11 | 6182 | 6318 | 6452 | 6585 | 6715 | 6843 | 6969 | 7094 |
| 12 | 6184 | 6320 | 6454 | 6587 | 6717 | 6845 | 6972 | 7096 |
| 13 | 6186 | 6322 | 6457 | 6589 | 6719 | 6847 | 6974 | 7098 |
| 14 | 6189 | 6325 | 6459 | 6591 | 6721 | 6850 | 6976 | 7100 |
| 15 | 6191 | 6327 | 6461 | 6593 | 6724 | 6852 | 6978 | 7102 |
| 16 | 6193 | 6329 | 6463 | 6596 | 6726 | 6854 | 6980 | 7104 |
| 17 | 6195 | 6331 | 6466 | 6598 | 6728 | 6856 | 6982 | 7106 |
| 18 | 6198 | 6334 | 6469 | 6600 | 6730 | 6858 | 6984 | 7108 |
| 19 | 6200 | 6336 | 6470 | 6602 | 6732 | 6860 | 6986 | 7110 |
| 20 | 6202 | 6338 | 6472 | 6604 | 6734 | 6862 | 6988 | 7112 |
| 21 | 6205 | 6340 | 6474 | 6606 | 6736 | 6864 | 6990 | 7114 |
| 22 | 6207 | 6343 | 6477 | 6608 | 6738 | 6867 | 6992 | 7116 |
| 23 | 6209 | 6345 | 6479 | 6611 | 6741 | 6869 | 6994 | 7118 |
| 24 | 6211 | 6347 | 6481 | 6613 | 6743 | 6871 | 6997 | 7120 |
| 25 | 6215 | 6349 | 6483 | 6615 | 6745 | 6874 | 6999 | 7122 |
| 26 | 6216 | 6352 | 6486 | 6617 | 6747 | 6875 | 7001 | 7124 |
| 27 | 6218 | 6354 | 6488 | 6620 | 6749 | 6877 | 7003 | 7126 |
| 28 | 6220 | 6356 | 6490 | 6622 | 6752 | 6879 | 7005 | 7128 |
| 29 | 6223 | 6358 | 6492 | 6624 | 6754 | 6881 | 7007 | 7130 |
| 30 | 6225 | 6361 | 6494 | 6626 | 6756 | 6883 | 7009 | 7132 |

61°
6494

## The Degrees of the Quadrant.

| mi | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
|---|---|---|---|---|---|---|---|---|
| 31 | 6227 | 6363 | 6497 | 6628 | 6758 | 6886 | 7011 | 7134 |
| 32 | 6230 | 6365 | 6499 | 6630 | 5760 | 6888 | 7013 | 7136 |
| 33 | 6232 | 6367 | 6501 | 6633 | 6762 | 6890 | 7015 | 7139 |
| 34 | 6234 | 6370 | 6503 | 6635 | 5764 | 6892 | 7017 | 7141 |
| 35 | 9236 | 6372 | 6505 | 6637 | 6766 | 6894 | 7019 | 7143 |
| 36 | 6239 | 6374 | 6508 | 6639 | 6769 | 6896 | 7021 | 7154 |
| 37 | 6241 | 6376 | 6510 | 6641 | 6771 | 6898 | 7023 | 7147 |
| 38 | 6243 | 6379 | 6512 | 6644 | 6773 | 6900 | 7026 | 7149 |
| 39 | 6245 | 6381 | 6514 | 6646 | 6775 | 6902 | 7028 | 7151 |
| 40 | 6248 | 6383 | 6516 | 6648 | 6777 | 6905 | 7030 | 7153 |
| 41 | 6250 | 6385 | 6519 | 6650 | 6779 | 6907 | 7032 | 7155 |
| 42 | 6252 | 6387 | 6521 | 6652 | 6781 | 6909 | 7034 | 7157 |
| 43 | 6255 | 6390 | 6523 | 6654 | 6783 | 6911 | 7036 | 7159 |
| 44 | 6257 | 6392 | 6525 | 6657 | 6786 | 6913 | 7038 | 7161 |
| 45 | 6259 | 6394 | 6527 | 6659 | 6788 | 6915 | 7040 | 7163 |
| 46 | 6261 | 6396 | 6530 | 6661 | 6790 | 6917 | 7042 | 7165 |
| 47 | 6264 | 6399 | 6532 | 6663 | 6792 | 6919 | 7044 | 7167 |
| 48 | 6266 | 6401 | 6534 | 6665 | 6794 | 6921 | 7046 | 7169 |
| 49 | 6268 | 6403 | 6536 | 6667 | 6796 | 6923 | 7048 | 7171 |
| 50 | 5270 | 6405 | 6539 | 6670 | 6799 | 6925 | 7050 | 7173 |
| 51 | 6273 | 6408 | 6541 | 6672 | 6801 | 6928 | 7052 | 7175 |
| 52 | 6275 | 6410 | 6543 | 6674 | 6803 | 6930 | 7054 | 7177 |
| 53 | 6277 | 6412 | 6545 | 6676 | 6895 | 6932 | 7057 | 7179 |
| 54 | 6279 | 6414 | 6547 | 6678 | 6807 | 6934 | 7059 | 7181 |
| 55 | 6282 | 6417 | 6550 | 6680 | 6809 | 6936 | 7061 | 7183 |
| 56 | 6284 | 6419 | 6552 | 6683 | 6811 | 6938 | 7063 | 7185 |
| 57 | 6286 | 6421 | 6554 | 6685 | 6813 | 6940 | 7065 | 7187 |
| 58 | 6289 | 6423 | 6556 | 6687 | 6816 | 6942 | 7067 | 7189 |
| 59 | 6291 | 6426 | 6558 | 6689 | 6818 | 6944 | 7069 | 7191 |
| 60 | 6293 | 6428 | 6560 | 6691 | 6820 | 6946 | 7071 | 7193 |

# A Table

## The Degree of the Quadrant.

| mi. | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 |
|---|---|---|---|---|---|---|---|---|
| 1 | 7195 | 7315 | 7433 | 7549 | 7662 | 7773 | 7882 | 7988 |
| 2 | 7197 | 7317 | 7435 | 7551 | 7664 | 7775 | 7884 | 7990 |
| 3 | 7199 | 7319 | 7437 | 7553 | 7666 | 7777 | 7885 | 7992 |
| 4 | 7201 | 7321 | 7439 | 7555 | 7668 | 7779 | 7887 | 7993 |
| 5 | 7203 | 7323 | 7441 | 7557 | 7670 | 7781 | 7889 | 7995 |
| 6 | 7205 | 7325 | 7443 | 7559 | 7672 | 7782 | 7891 | 7997 |
| 7 | 7207 | 7327 | 7445 | 7560 | 7673 | 7784 | 7893 | 7998 |
| 8 | 7209 | 7329 | 7447 | 7562 | 7675 | 7786 | 7894 | 8000 |
| 9 | 7211 | 7331 | 7449 | 7564 | 7677 | 7788 | 7896 | 8002 |
| 10 | 7213 | 7333 | 7451 | 7566 | 7679 | 7790 | 7898 | 8004 |
| 11 | 7215 | 7335 | 7453 | 7568 | 7681 | 7791 | 7900 | 8005 |
| 12 | 7218 | 7337 | 7455 | 7570 | 7683 | 7793 | 7901 | 8007 |
| 13 | 7220 | 7339 | 7457 | 7572 | 7685 | 7795 | 7903 | 8009 |
| 14 | 7222 | 7341 | 7459 | 7574 | 7687 | 7797 | 7905 | 8011 |
| 15 | 7224 | 7343 | 7461 | 7576 | 7688 | 7799 | 7907 | 8012 |
| 16 | 7226 | 7345 | 7463 | 7577 | 7690 | 7801 | 7909 | 8014 |
| 17 | 7228 | 7347 | 7464 | 7579 | 7692 | 7803 | 7910 | 8016 |
| 18 | 7230 | 7349 | 7466 | 7581 | 7594 | 7804 | 7912 | 8018 |
| 19 | 7232 | 7351 | 7468 | 7583 | 7696 | 7806 | 7914 | 8019 |
| 20 | 7234 | 7353 | 7470 | 7585 | 7698 | 7808 | 7916 | 8021 |
| 21 | 7236 | 7355 | 7472 | 7587 | 7700 | 7810 | 7918 | 8023 |
| 22 | 7238 | 7357 | 7474 | 7589 | 7701 | 7811 | 7919 | 8025 |
| 23 | 7240 | 7359 | 7476 | 7591 | 7703 | 7813 | 7921 | 8026 |
| 24 | 7242 | 7361 | 7478 | 7593 | 7705 | 7815 | 7923 | 8028 |
| 25 | 7244 | 7363 | 7480 | 7595 | 7707 | 7817 | 7925 | 8030 |
| 26 | 7246 | 7365 | 7482 | 7596 | 7709 | 7819 | 7926 | 8032 |
| 27 | 7248 | 7367 | 7484 | 7598 | 7711 | 7821 | 7928 | 8033 |
| 28 | 7250 | 7369 | 7486 | 7600 | 7712 | 7822 | 7930 | 8035 |
| 29 | 7252 | 7371 | 7488 | 7602 | 7714 | 7824 | 7932 | 8037 |
| 30 | 7254 | 7373 | 7490 | 7604 | 7716 | 7826 | 7933 | 8038 |

## The Degrees of the Quadrant.

| mi. | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 |
|---|---|---|---|---|---|---|---|---|
| 31 | 7256 | 7375 | 7491 | 7606 | 7718 | 7828 | 7935 | 8040 |
| 32 | 7258 | 7377 | 7493 | 7608 | 7720 | 7830 | 7937 | 8042 |
| 33 | 7260 | 7379 | 7495 | 7610 | 7722 | 7832 | 7939 | 8044 |
| 34 | 7262 | 7381 | 7497 | 7612 | 7724 | 7833 | 7941 | 8045 |
| 35 | 7264 | 7382 | 7499 | 7614 | 7725 | 7835 | 7942 | 8047 |
| 36 | 7266 | 7384 | 7501 | 7615 | 7727 | 7837 | 7944 | 8049 |
| 37 | 7268 | 7386 | 7503 | 7617 | 7729 | 7839 | 7946 | 8051 |
| 38 | 7270 | 7388 | 7505 | 7619 | 7731 | 7840 | 7948 | 8052 |
| 39 | 7272 | 7390 | 1507 | 7621 | 7733 | 7842 | 7949 | 8054 |
| 40 | 7274 | 7392 | 7509 | 7623 | 7735 | 7844 | 7951 | 8056 |
| 41 | 7276 | 7394 | 7511 | 7625 | 7737 | 7846 | 7953 | 8058 |
| 42 | 7278 | 7396 | 7513 | 7627 | 7739 | 7848 | 7955 | 8059 |
| 43 | 7280 | 7398 | 7514 | 7629 | 7740 | 7849 | 7956 | 8061 |
| 44 | 7282 | 7400 | 7516 | 7630 | 7742 | 7851 | 7958 | 8063 |
| 45 | 7284 | 7402 | 7518 | 7632 | 7744 | 7853 | 7960 | 8664 |
| 46 | 7286 | 7404 | 7520 | 7634 | 7746 | 7855 | 7962 | 8066 |
| 47 | 7288 | 7406 | 7522 | 7636 | 7748 | 7857 | 7963 | 8068 |
| 48 | 7290 | 7408 | 7524 | 7638 | 7750 | 7858 | 7965 | 8070 |
| 49 | 7292 | 7410 | 7526 | 7640 | 7751 | 7860 | 7967 | 8071 |
| 50 | 7294 | 7412 | 7528 | 7642 | 7753 | 7862 | 7969 | 8073 |
| 51 | 7296 | 7414 | 7530 | 7644 | 7755 | 8864 | 7970 | 8075 |
| 52 | 7298 | 7416 | 7539 | 7645 | 7757 | 7866 | 7972 | 8076 |
| 53 | 7300 | 7418 | 7534 | 7647 | 7759 | 7867 | 7974 | 8078 |
| 54 | 7302 | 7420 | 7536 | 7649 | 7760 | 7869 | 7976 | 8080 |
| 55 | 7304 | 7422 | 7537 | 7651 | 7762 | 7871 | 7977 | 8082 |
| 56 | 7305 | 7424 | 7539 | 7653 | 7764 | 7873 | 7979 | 8083 |
| 57 | 7307 | 7426 | 7541 | 7655 | 7766 | 7875 | 7981 | 8085 |
| 58 | 7309 | 7428 | 7543 | 7657 | 7768 | 7876 | 7983 | 8087 |
| 59 | 7311 | 7430 | 7545 | 7658 | 7770 | 7878 | 7985 | 8088 |
| 60 | 7313 | 7431 | 7547 | 7660 | 7771 | 7880 | 7986 | 8090 |

# A Table

## The Degrees of the Quadrant.

| mi | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---|---|---|---|---|---|---|---|
| 1 | 8092 | 8193 | 8292 | 8388 | 8482 | 8573 | 8662 |
| 2 | 8094 | 8195 | 8294 | 8390 | 8483 | 8575 | 8663 |
| 3 | 8095 | 8197 | 8295 | 8391 | 8485 | 8576 | 8565 |
| 4 | 8097 | 8198 | 8297 | 8393 | 8487 | 8578 | 8666 |
| 5 | 8099 | 8200 | 8298 | 8395 | 8489 | 8579 | 8668 |
| 6 | 8100 | 8201 | 8300 | 8396 | 8490 | 8481 | 8669 |
| 7 | 8102 | 8203 | 8302 | 8398 | 8491 | 8582 | 8670 |
| 8 | 8104 | 8205 | 8303 | 8399 | 8493 | 8584 | 8672 |
| 9 | 8105 | 8206 | 8305 | 8401 | 8494 | 8585 | 8673 |
| 10 | 8107 | 8208 | 8307 | 8402 | 8496 | 8537 | 8675 |
| 11 | 8109 | 8210 | 8308 | 8404 | 8497 | 8588 | 8676 |
| 12 | 8111 | 8212 | 8310 | 8406 | 8499 | 8590 | 8678 |
| 13 | 8112 | 8213 | 8311 | 8407 | 8500 | 8591 | 8679 |
| 14 | 8114 | 8215 | 8313 | 8409 | 8502 | 8593 | 8681 |
| 15 | 8116 | 8216 | 8315 | 8310 | 8503 | 8594 | 8682 |
| 16 | 8117 | 8218 | 8316 | 8412 | 8504 | 8596 | 8684 |
| 17 | 8119 | 8220 | 8318 | 8414 | 8506 | 8597 | 8685 |
| 18 | 8121 | 8221 | 8319 | 8415 | 8507 | 8599 | 8687 |
| 19 | 8122 | 8223 | 8321 | 8417 | 8509 | 8600 | 8688 |
| 20 | 8124 | 8225 | 8323 | 8418 | 8511 | 8602 | 8690 |
| 21 | 8126 | 8226 | 8324 | 8420 | 8513 | 8603 | 8691 |
| 22 | 8128 | 8228 | 8326 | 8421 | 8514 | 8605 | 8692 |
| 23 | 8129 | 8230 | 8328 | 8423 | 8516 | 8606 | 8694 |
| 24 | 8131 | 8231 | 8329 | 8424 | 8517 | 8607 | 8695 |
| 25 | 8133 | 8233 | 8331 | 8426 | 8519 | 8608 | 8697 |
| 26 | 8134 | 8235 | 8332 | 8428 | 8520 | 8610 | 8698 |
| 27 | 8136 | 8236 | 8334 | 8429 | 8522 | 8612 | 8699 |
| 28 | 8138 | 8238 | 8336 | 8431 | 8523 | 8613 | 8701 |
| 29 | 8139 | 8240 | 8337 | 8432 | 8525 | 8615 | 8702 |
| 30 | 8141 | 8241 | 8339 | 8434 | 8526 | 8616 | 8704 |

The Degrees of the Quadrant.

| mi | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---|---|---|---|---|---|---|---|
| 31 | 8143 | 8243 | 8340 | 8435 | 8528 | 8618 | 8705 |
| 32 | 8144 | 8245 | 8342 | 8437 | 8529 | 8619 | 8706 |
| 33 | 8146 | 8146 | 8344 | 8438 | 8531 | 8621 | 8708 |
| 34 | 8184 | 8248 | 8345 | 8440 | 8532 | 8622 | 8709 |
| 35 | 8149 | 8249 | 8347 | 8442 | 8535 | 8623 | 8711 |
| 36 | 8151 | 8251 | 8348 | 8443 | 8536 | 8625 | 8712 |
| 37 | 8153 | 8253 | 8350 | 8445 | 8537 | 8627 | 8713 |
| 38 | 8155 | 8254 | 8352 | 8446 | 8539 | 8628 | 8715 |
| 39 | 8156 | 8256 | 8353 | 8448 | 8540 | 8530 | 8716 |
| 40 | 8158 | 8257 | 8355 | 8449 | 8542 | 8631 | 8718 |
| 41 | 8160 | 8259 | 8356 | 8451 | 8543 | 8633 | 8719 |
| 42 | 8161 | 8261 | 8358 | 8452 | 8545 | 8634 | 8721 |
| 43 | 8163 | 8263 | 8360 | 8454 | 8546 | 8636 | 9722 |
| 44 | 8165 | 8264 | 8361 | 8455 | 8548 | 8637 | 8724 |
| 45 | 8166 | 8266 | 8363 | 8457 | 8549 | 8638 | 8725 |
| 46 | 8168 | 8267 | 8364 | 8458 | 8551 | 8640 | 8726 |
| 47 | 8169 | 8269 | 8366 | 8460 | 8552 | 8641 | 8728 |
| 48 | 8171 | 8271 | 8367 | 8462 | 8554 | 8643 | 8729 |
| 49 | 8173 | 8272 | 8369 | 8463 | 8555 | 8644 | 8731 |
| 50 | 8175 | 8274 | 8371 | 8465 | 8557 | 8646 | 8732 |
| 51 | 8176 | 8276 | 8372 | 8466 | 8558 | 8647 | 8733 |
| 52 | 8178 | 8277 | 8374 | 8468 | 8560 | 8649 | 8735 |
| 53 | 8180 | 8279 | 8375 | 8470 | 8561 | 8650 | 8736 |
| 54 | 8181 | 8281 | 8377 | 8471 | 8563 | 8652 | 8738 |
| 55 | 8183 | 8282 | 8379 | 8473 | 8564 | 8653 | 8739 |
| 56 | 8185 | 8284 | 8380 | 8474 | 8566 | 8654 | 8740 |
| 57 | 8186 | 8285 | 8382 | 8476 | 8567 | 8656 | 8742 |
| 58 | 8188 | 8287 | 8383 | 8477 | 8569 | 8657 | 8743 |
| 59 | 8190 | 8289 | 8385 | 8479 | 8570 | 8659 | 8745 |
| 60 | 8191 | 8290 | 8387 | 8480 | 8572 | 8660 | 8746 |

# A Table

## The Degrees of the Quadrant.

| mi | 61 | 62 | 63 | 64 | 65 | 66 | 67 |
|---|---|---|---|---|---|---|---|
| 2 | 8749 | 8832 | 8913 | 8990 | 9065 | 9138 | 9207 |
| 4 | 8752 | 8835 | 8915 | 8993 | 9068 | 9140 | 9209 |
| 6 | 8755 | 8838 | 8918 | 8995 | 9070 | 9142 | 9212 |
| 8 | 8758 | 8841 | 8921 | 8998 | 9073 | 9145 | 9214 |
| 10 | 8760 | 8843 | 8923 | 9000 | 9075 | 9147 | 9216 |
| 12 | 8763 | 8846 | 8926 | 9003 | 9078 | 9149 | 9218 |
| 14 | 8766 | 8849 | 3928 | 9006 | 9080 | 9152 | 9221 |
| 16 | 8769 | 8852 | 8931 | 9008 | 9083 | 9154 | 9223 |
| 18 | 8771 | 8854 | 3934 | 9011 | 9085 | 9156 | 9225 |
| 20 | 8774 | 8857 | 8936 | 9013 | 9087 | 9159 | 9228 |
| 22 | 8777 | 8860 | 8939 | 9016 | 9090 | 9161 | 9230 |
| 24 | 8780 | 8862 | 8941 | 9018 | 9092 | 9164 | 9232 |
| 26 | 9783 | 8865 | 8944 | 9021 | 9095 | 9166 | 9234 |
| 28 | 8785 | 8867 | 8947 | 9023 | 9097 | 9168 | 9236 |
| 30 | 8788 | 8870 | 8949 | 9026 | 9100 | 9171 | 9239 |
| 32 | 8791 | 8873 | 8952 | 9028 | 9102 | 9173 | 9241 |
| 34 | 8794 | 4875 | 8954 | 9031 | 9104 | 9175 | 9243 |
| 36 | 8796 | 8878 | 8957 | 9033 | 9107 | 9177 | 9245 |
| 38 | 8799 | 8880 | 8960 | 9036 | 9109 | 9180 | 9247 |
| 40 | 8802 | 8883 | 8962 | 9038 | 9112 | 9182 | 9250 |
| 42 | 8805 | 8886 | 8965 | 9041 | 9114 | 9184 | 9252 |
| 44 | 8808 | 8889 | 8967 | 9043 | 9116 | 9187 | 9254 |
| 56 | 8810 | 8891 | 8970 | 9046 | 9119 | 9189 | 9256 |
| 48 | 8813 | 8894 | 8972 | 9048 | 9121 | 9191 | 9259 |
| 50 | 8816 | 8897 | 8975 | 9051 | 9123 | 9194 | 9261 |
| 52 | 8819 | 8899 | 8978 | 9056 | 9126 | 9196 | 9263 |
| 54 | 8821 | 8902 | 8980 | 9056 | 9128 | 9198 | 9265 |
| 56 | 8824 | 8905 | 8983 | 9058 | 9131 | 9200 | 9267 |
| 58 | 8827 | 8907 | 8985 | 9061 | 9133 | 9203 | 9270 |
| 60 | 8830 | 8910 | 8988 | 9063 | 9135 | 9205 | 9272 |

## The Degrees of the Quadrant.

| m | 68 | 6 | 70 | 71 | 72 | 73 | 74 |
|---|---|---|---|---|---|---|---|
| 2 | 9274 | 9338 | 9399 | 9457 | 9512 | 9565 | 9614 |
| 4 | 9276 | 9340 | 9401 | 9459 | 9514 | 9566 | 9616 |
| 6 | 9278 | 9342 | 9403 | 9461 | 9516 | 9568 | 9617 |
| 8 | 9280 | 9344 | 9405 | 9463 | 9518 | 9570 | 9619 |
| 10 | 9283 | 9346 | 9407 | 6465 | 9519 | 9571 | 9620 |
| 12 | 9285 | 9348 | 9409 | 9466 | 9521 | 9573 | 9622 |
| 14 | 9287 | 9352 | 9411 | 9468 | 9523 | 9575 | 9624 |
| 16 | 9289 | 9351 | 9413 | 9470 | 9525 | 9576 | 9625 |
| 18 | 9291 | 9354 | 9415 | 9472 | 9527 | 9578 | 9627 |
| 20 | 9293 | 9356 | 9417 | 9474 | 9528 | 9580 | 9628 |
| 22 | 9296 | 9358 | 9419 | 9476 | 9530 | 9581 | 9630 |
| 24 | 9298 | 9360 | 9420 | 9478 | 9532 | 9583 | 9632 |
| 26 | 9300 | 9363 | 9422 | 9480 | 9534 | 9585 | 9633 |
| 28 | 9302 | 9365 | 9424 | 9481 | 9535 | 9586 | 9635 |
| 30 | 9304 | 9367 | 9426 | 9483 | 9537 | 9588 | 9636 |
| 32 | 9306 | 9369 | 9428 | 9485 | 9539 | 9580 | 9638 |
| 34 | 9308 | 9371 | 9430 | 9487 | 9540 | 9591 | 9639 |
| 36 | 9310 | 9373 | 9432 | 9489 | 9542 | 9593 | 9641 |
| 38 | 9313 | 9375 | 9434 | 9491 | 9544 | 9595 | 9642 |
| 40 | 9315 | 9377 | 9436 | 9492 | 9546 | 9596 | 9644 |
| 42 | 9317 | 9379 | 9438 | 9494 | 9548 | 9598 | 9645 |
| 44 | 9319 | 9391 | 9440 | 9496 | 9549 | 9600 | 9647 |
| 46 | 9321 | 9383 | 9442 | 9498 | 9551 | 9601 | 9648 |
| 48 | 9323 | 9385 | 9444 | 9500 | 9553 | 9603 | 9650 |
| 50 | 9325 | 9387 | 9446 | 9501 | 9554 | 9604 | 9651 |
| 52 | 9327 | 9389 | 9447 | 9503 | 9556 | 9606 | 9653 |
| 54 | 9329 | 9391 | 9449 | 9505 | 9558 | 9608 | 9655 |
| 56 | 9332 | 9393 | 9451 | 9507 | 9559 | 9609 | 9656 |
| 58 | 9334 | 9395 | 9453 | 9509 | 9561 | 9611 | 9658 |
| 60 | 9336 | 9397 | 9455 | 9510 | 9563 | 9613 | 9659 |

# A Table

## The Degrees of the Quadrant.

| mi | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 |
|---|---|---|---|---|---|---|---|---|
| 5 | 9663 | 9706 | 9747 | 9784 | 9819 | 9850 | 9879 | 9905 |
| 10 | 9667 | 9710 | 9750 | 9787 | 9822 | 9853 | 9881 | 9907 |
| 15 | 9670 | 9713 | 9753 | 9790 | 9824 | 9855 | 9884 | 9909 |
| 20 | 9674 | 9717 | 9755 | 9793 | 9827 | 9858 | 9886 | 9911 |
| 25 | 9678 | 9720 | 9760 | 9796 | 9830 | 9860 | 9888 | 9912 |
| 30 | 9681 | 9724 | 9763 | 9799 | 9832 | 9863 | 9890 | 9914 |
| 35 | 9685 | 9727 | 9766 | 9802 | 9835 | 9865 | 9892 | 9916 |
| 40 | 9689 | 9730 | 9769 | 9805 | 9838 | 9868 | 9894 | 9918 |
| 45 | 9692 | 9734 | 9772 | 9808 | 9840 | 9870 | 9896 | 9920 |
| 50 | 9695 | 9737 | 9775 | 9811 | 9843 | 9872 | 9898 | 9922 |
| 55 | 9699 | 9740 | 9778 | 9813 | 9846 | 9874 | 9900 | 9924 |
| 60 | 9703 | 9744 | 9781 | 9816 | 9848 | 9877 | 9903 | 9925 |

## Degrees of the Quadrant.

| mi | 83 | 84 | 85 | 86 | 87 | 88 | 89 |
|---|---|---|---|---|---|---|---|
| 5 | 9927 | 9947 | 9963 | 9977 | 9987 | 9994 | 9998 |
| 10 | 9929 | 9948 | 9964 | 9978 | 9988 | 9995 | 9998 |
| 15 | 9931 | 9950 | 9965 | 9978 | 9988 | 9995 | 9998 |
| 20 | 9932 | 9951 | 9967 | 9979 | 9989 | 9996 | 9999 |
| 25 | 9934 | 9952 | 9968 | 9980 | 9990 | 6996 | 9999 |
| 30 | 9936 | 9954 | 9969 | 9981 | 9990 | 9996 | 9999 |
| 35 | 9937 | 9955 | 9970 | 9982 | 9991 | 9997 | 99 |
| 40 | 9939 | 9957 | 9971 | 9983 | 9992 | 9997 | 99 |
| 45 | 9940 | 9958 | 9972 | 9984 | 9992 | 9998 | 99 |
| 50 | 9942 | 9959 | 9973 | 9984 | 9993 | 9998 | 99 |
| 55 | 9944 | 9960 | 9975 | 9985 | 9993 | 9998 | 99 |
| 60 | 9945 | 9962 | 9976 | 9986 | 9994 | 9998 | 10000 |
| | | | | | | | 10000 |

The

# The Extraction of rootes.

It is not vnneceſſarie, before we doe enter into the order & methode of teaching how to extract a roote, to ſhewe the diuers kindes & their definitions: therfore you muſt know that of roots there are ſundrye ſortes, according to the quantities from which they are deriued, as the ſquares, Cubes, ſquared ſquares, ſurdſolides, &c, for the numbers receiue their names of the ſaid quantities, euerie quantitie hauing his roote which may be called the firſt quantitie becauſe it is the ſide or beginning of the quantitie whereunto it is ſet: numbers of the ſecond quantie are called ſquares, of the third Cubes, of the fourth ſquared ſquares as before: wherein you may proceede infinitely if you will, but you ſhall ſildome or neuer haue vſe for the extraction of the roote of any quantitie more then ſquares and Cubes: A ſquare number is the product of any number multiplyed in it ſelfe, and the roote thereof is the multiplyer whereby the ſame ſquare number is produced: as for example, 4. is a ſquare number comming of the multiplycation of 2. in it ſelfe which is the roote thereof.

A Cubicke number is the product of any number multiplyed into it ſelfe, and the ſame product multiplyed againe by the firſt number: as 2. multiplyed by it ſelfe is 4. that product multiplyed againe by 2. the firſt number makes 8. which is a Cubicke number, and the roote thereof is 2.

A ſquared ſquare number, is produced of 3. multiplycations: firſt any num, by it ſelfe makes a ſquare number, that product againe by the firſt rote or multiplyer, makes a Cubicke number & laſtly that product againe by the firſt number or roote, produceth a ſquared ſquare number, as 2. multiplied in it ſelfe makes 4. a ſquare

number

number, that againe by 2. makes 8. which is a Cubicke number & then that product againe by 2. produceth 16. which is a squared square number: and the roote thereof is 2. A surdsolide number is the product of any number multiplyed foure times by the roote thereof: as 32. is a surdsolide number, the roote whereof is 2 for 2. multiplyed in it selfe is 4. that multiplyed againe by 2. is 8. the same product againe by 2. makes 16. & lastly the same product multiplyed by the first number 2. makes 32. therefore I conclude that 32 is a surdsolide number, & the number 2. whereby the said number is produced, is the surdsolide roote to the saide number: and thus multiplying the last product by the first number or roote, you may proceede infinitely, but more then these are needlesse, and as I said before, without any great or common vse.

Now for the finding of the roote, it must be done according to the quantitie wherof it maketh the denomination, as whether it be of a square or Cube, or otherwise: which knowne, let vs proceede to the working thereof.

You must vnderstand that the order of extracting the roote of any quantitie, is not much vnlike to deuision, differing onely in this, that whereas in diuision the deuisor is known, but here it is to finde, also in diuision you alwaies keep one deuisor, but in this you must change your deuisor at each remouing, which is at the finding of euerie figure contained in the roote: now therefore I will lay downe one generall way for the extraction of the roote of all quantities whatsoeuer, which is done by certaine numbers applyed to each seuerall quantitie, which are those: for the square roote is one number required, which is 20. For the Cube 2. nũbers, which are 300. & 30. For the squared square 3. numbers. viz. 4000. 600. & 40

Thus hauing declared the kindes numbers, quantities, and order of the extraction of all sortes of rootes, it followeth that we proceede to the practise thereof: And first for to extract the square roote of any number, you must consider as before I haue said, that 20 is the number for the same quantitie: also you must learne by memorie the iust square of all the 9. vnities, which if you know not, this table will stand you in some stead: where you see that against euerie of the 9. vnities aforesaid towards the right hand is

the

the ſquare of that vnitie againſt which it doth ſtand: which knowne, ſet downe the number whereof you would extract the ſquare roote, then vnder the laſt figure at the right hand, put a pricke, and then proceeding towards the left hand vnder euerie ſecond figure put a pricke, that done drawe with your pen a quotient as in diuiſion: Now for to finde the roote of your giuen number, ſeeke the greateſt ſquare number contained in the number ouer the firſt pricke, that ſquare number take from the number ouer the ſaid firſt pricke, & ſet the remainer ouer it, the root of which ſquare number put in the quotient for the firſt figure of the roote: that roote multiply by 20. the number for the ſquare re[illegible]nd looke how often the product thereof may be taken from t[illegible]mber ouer or to the left hand of the ſecond pricke, which put in your quotient for the ſecond figure of your roote, but this is to be noted for a generall rule, that you muſt take no greater number for your ſecond figure, then that the ſquare thereof added with the former product, may be taken from the number ouer the ſaid ſecond pricke: and alſo looke how many pricks are vnder your giuen number, ſo many figures muſt be in the quotient for the roote of the ſaid number: then hauing found two figures in the quotient, if there be any more pricks, multiply the whole number in the quotient by 20. and ſeeke how often the product thereof may be taken from the number ouer or belonging to the nert pricke, which number, put in the quotient, and adding the ſquare therof to the former product, ſubſtract the whole ſumme from the number ouer the ſaid pricke, and cancelling the ſaid uumber as at each remoone you muſt doe, ſet the remainer ouer it, and if there be any more prickes vndone, doe as you did before alwaies multiplying the quotient by 20. thereto adding the ſquare of the laſt figure, & the totall ſumme being ſubſtracted from the laſt remainer, if there reſt nothing, it is a ſquare number or elſe not, which you may proone, if you multiply the roote by it ſelfe ſquarely, for the root being truly extracted, will produce the firſt giuen number. But becauſe that examples are eaſieſt for the vnderſtanding, let 104976. be the giuen number whereof I would know the ſquare roote, viz. what number

| | |
|---|---|
| 1 | 1 |
| 2 | 4 |
| 3 | 15 |
| 4 | 16 |
| 5 | 25 |
| 6 | 36 |
| 7 | 49 |
| 8 | 64 |
| 9 | 81 |

being

being multiplyed into it selfe, will produce the aforesaid number of 104976. Therefore first I set downe the said number & vnder the last figure towards the right hand, which in this example is 6. I put a pricke or point, another vnder the 9. & lastly, another vnder 0. leauing one figure betwixt euerie prick: which done and the quotient drawne, the giuen number will stand thus : 104976. whereby I see that the roote of the said number must consist of 3. figures, because it hath 3. prickes vnder it: then I seeke the greatest square number in 10. it beiug the number belonging to the first pricke towards the left hand, that I finde to be 9. which is produced [illegible] multiplyed squarely, therefore I put 3. in the quotient for [illegible] figure of the root, and the square thereof being 9. I substra[illegible] 10. the number ouer the first pricke, & there rests 1. The order of which worke will stand thus:

```
 1.
1̸0̸4976|3
 9.
```

where you see that the figures ouer the first pricke cancelled, there is 3. in the quotient for ye first figure of the roote and 1. rests, which with the figures betwixt it & the next pricke, makes 149. for the number of the second pricke. Now for the second figure of the roote, I multiply 3. the roote already found by 20. and the product is 60. that I seeke how often I may take from 149. the number ouer the second pricke, which I may do 2. times, for 2. times 60. is 120. whereunto the square of 2. which is 4. being added, makes 124. that substracted from 149. leaues 25. therefore I put 2. in the quotient for the secōd figure of the roote, and cancelling the figures ouer the second pricke, the remainer being put ouer it, the working thereof will stand in this order: where you see the quotient is 32. for the 2. first figures of the root, and the figures of the 2. first prickes being cancelled, there restes 25. which with the other figures betwixt them & the third & last pricke makes 2576. for the number ouer the last pricke: now therefore, to finde the last figure of the root, I multiply the roote already found, that is to say 32. by 20. & the product thereof is 640. that I seek how oft it may be ta-

```
 1̸25
1̸0̸4̸976|32.
 9
 124
```

```
 20
  3
 60
  2
120
  4
124
```

ken

ken out of 2576. the number ouer the last prick, which may be done foure times, for foure times 640. is 2560. whereunto if I adde the square of 4. there will amount 2576. which because it may be taken from the number remaining ouer the last pricke, I put 4 in the quotient for the last figure of the roote, and substracting the former product of 2576. from the number ouer the last prick, which is likewise 2576. there will rest nothing, therefore I cancell those figures likewise, and thereby conclude 104976. to bee a Square number, & 324. to bee the root thereof: the prowfe whereof is by multiplying ỳ root into it selfe squarely: for if you multiply 324 by 324. ỳ first giuen numb. of 104976. will be produced, ỳ working thereof will be as aboue you may see.

| | |
|---|---|
| xxx | |
| x04976 | 324 |
| 9 | |
| 124 | |
| 2576 | |
| | 32 |
| | 20 |
| | 640 |
| | 4 |
| | 2560 |
| | 16 |
| | 2576 |
| | 324 |
| | 324 |
| | 1296 |
| | 648 |
| | 972 |
| | 104976 |

This example in my minde, might be sufficient with often vse and practise to bring perfection in this kinde of Extractions, because that although the somme be neuer so great, it is don all by one maner of worke: yet neuertheless, if I did not thinke that thou wouldest complaine rather of tediousnes of learning, then of the difficulty in teaching, I wold giue another example, for variety of examples makes the worke seeme the more easie: therefore once againe: let 54873.30625 bee a giuen number, whereof I would know the square roote: first I put prickes or points vnder the giuen number in such order as you see, beginning at the last figure towards the right hand, & proceeding towards the left, leauing one figure vnpointed betwirt euery pricke, where you see that the whole giuen nũber consists of 5. pricks, therfore of so many figures must your Roote or quotient bee: then drawing a quotient, I seeke the greatest square number in 5. which is the number ouer the first pricke, which greatest square number I finde to be 4 and the roote thereof

thereof 2, for two times two is foure, therefore I put 2. in the quotient and taking 4. the Square therof from 5. the number ouer the first pricke, there will rest 1. which I set ouer 5. cancelling the said 5. the working whereof will stand as aboue, then for the second figure of the Roote I multiplye 2. the first figure of the roote alreadye found by 20. and the product is 40. that I seek how often may be taken from 148. the number remayning ouer the second pricke, which may be done 3. times, for 3, times 40. is 120 wherennto the square of 3. being added makes 129. then I put 3. in the quotient for the second figure of the roote, & substracting 129. the last product from 148 the number remaining ouer the second prick, there will rest 19. which with the other figures betwixt them and the next prick, makes 1973. therfore I cancell the 148. and setting the remainer ouer it, I haue 1973. for the number ouer the third prick, and 23. in the quotient for the 2. first figures of the root. now for ẏ third figure of the roote I multiply 23. the roote already found by 20. the product is 460. which may be taken from 1973. the number remaining ouer the third prick foure times, for 460, multiplyed by 4. makes 1840. whereunto adding 16. the square of 4. the product is 1856, therefore I put 4. in the quotient for the third figure of the roote, and substracting 1856 from 1973. the number ouer the third pricke, there will remain 117. which with the other figures betwixt them and the next prick, makes 11706. for the number ouer the fourth pricke, and there is in the quotient 234.

1
~~5~~48730625|2
4

20
2
40
3
120
9
129

~~1~~19
~~5~~~~4~~8730625|23
4
~~1~~29

23
20
460
4
1840
16
1856

1
~~1~~~~1~~~~9~~17
~~5~~~~4~~8730625|234

for

for the roote already found, the whole worke standing as aboue: Againe for to finde the fourth figure of the roote, I multiply 234. the roote found, by 20. ẏ product wherof is 4680, which may be takē out of 11706. two times, for 4680 multiplied by 2. makes 9360. which with 4. ẏ square of 2. makes in al 9364 the same being substracted frō 11706. the number remaining ouer the 4. prick there wil rest 2342. w̄ with the other figures betwixt them and the 5. or last prick, makes 234225. for the number remaining ouer the last prick: therefore making my substraction, I set the remainer ouer it, & put 2. in the quotient for the fourth figure of the roote as you may see in the margine: then to finde the last figure of the roote of this giuen numb. aforesaid, I multiply the whole roote already foūd, viz. 2342. by 20. ẏ product is 46840. which may be taken from 234225. the number ouer the last pricke 5. times, for 46840. multiplyed by 5. makes 234200. whereunto if I adde 25, the square of 5. the whole product will be 234225, which number is equal to the number ouer the last prick, therefore I put 5, in the quotient, for the last figure of the roote, & substracting the whole summe of the last product viz. 234225, frō the number ouer the last point or prick, which is likewise 234225, there wil remaine nothing: whereby I finde 548730625, the giuen number to be a square number, and the root thereof to be 23425, which is the number found out in the quotient as in this working thereof you may more plainely perceiue.

```
      1
   11917
   548730625 |234
   4   1856
   129
                234
                  20
                ----
                4680
                   2
                ----
                9360
                   4
              -----
                9364
     123
  11917 42
  548730625 |2342
  4
  129
   1856
     9364
                2342
                  20
              -----
               46840
                   5
              -----
              234200
                  25
              -----
              23422
```

For

For proofe whereof, if you multiply 23425. the root squarely into it selfe, the product therof will be equall to the first giuen number, as in this example you may see.

```
   123
 1191742
 54873062 5 | 23425
 4
 129
  1856
    9364
     234225
          234225
           29425
          ------
          117125
          46850
         93700
        70275
       46850
       ------
       54 730625
```

I doubt not but to any indifferēt cōceit these two examples wil suffice aswel as if I shold contriue a whole volume therof, when it is so that the giuen number is a right square number but if ẏ giuen number be not a square number, it is vnpossible for to finde an exact root thereto, but that after the worke, there will remaine something as a fraction or part of a nūber more to be added to the quotiēt: for the true & perfect valuation of which fraction or remainer, none as yet could attain, but they haue set down so nere a way for the extraction of the roote of any number not being a square number, that therby no great error may be perceiued: For the knowledge & better vnderstanding of which, let this be a familiar example: you know that 16. is a right square nūber, & ẏ square root therof is 4. but if you would extract the square root of 18. you shold haue 4. in your quotient likewise for the root thereof, but then there will rest 2. whereby you see that 18. is no square number, neither can you know what fraction to make of it by reason that you haue no certaine deuisor, which might stand for donominator to the numerator or remainer: onely let this suffice, that to finde the nearest root there, the rule is thus: double the remainer for the numerator and quadruple; viz. multiply the root by 4. & thereto adone the denominator to the said numerator, as in this example to extract the nearest square roote of 18. I finde 4. to be in the quotient, & 2. remainiug, which 2.

```
  2
 18 | 4 4/17
 16
```

being

being doubled, makes 4. for the numerator, & 4. the root being multiplyed by 4. makes 16. and one added therwith, makes 17 for denominator, wherby I say that 4. $\frac{1}{17}$. is the nearest square root of 18. which may be found out, for if you reduce 4. $\frac{1}{17}$. into one common denomination, and then multiply them squarely, the product will be 17. $\frac{15}{16}$. which is but $\frac{1}{16}$. to little.

¶ Thus hauing declared the order how to extract ỹ square root of any nũber: it resteth now that I shew the mãner of extracting the Cube roote of any number: as for the principall vses thereof, you shall finde in the generall practise of the Mathematickes.

To finde out the Cube root of a giuen number, being a right Cube number, First put downe the giuen number, & as in the square nũber you put points or pricks, begining at ỹ right hãd & so towards ỹ left, leauing betwixt ech point one figure void, so in the extractiõ of the root of a Cube number, you must leaue two figures void or vnpriet betwixt euery point, and as in the square root, so likewise in this: loke how many points are vnder the giuen number, so many figures must be cõtained in the root therof, which is also to be obserued in extracting the root of any quantity whatsoeuer: these things being cõsidered, it is also necessary, that you know the greatest Cubicke nũber of euery of the 9. vnities, wherof the table here vnder specified maketh explanation: where you see that against each vnitie, stãdeth the Cube number therof, which being known, and thee giuen number prickt, with a quotient drawne as before I haue shewed: to extract the Cube root, you haue two numbers, viz. 300 & 30. but because the declaratiõ of the working therof would be too long to expresse in tearmes, let 13824. be a giuen number, whereof I would extract the Cube root. First I put downe ỹ number aforesaid, with points vnder it, and a quotient in this order.

| | |
|---|---|
| 1 . . . . | 1 |
| 2 . . . . | 8 |
| 3 . . . . | 27 |
| 4 . . . . | 64 |
| 5 . . . . | 125 |
| 6 . . . . | 216 |
| 7 . . . . | 343 |
| 8 . . . . | 512 |
| 9 . . . . | 729 |

13824 | __ whereby I see that the root thereof must consist of two figures, because so many points do belong vnto

vnto the giuen number, for the first figure whereof I seeke the greatest Cube number contained in 13. ỹ number ouer the first point towards the left hand, which I find to be 8. the Cube root therof which is 2. I put in the quotient for the first figure of the roote, and substracting 8. from 13. rests 5 which I put ouer 13 cancelling the said 13, which done, the worke will be as aboue.

Now for to finde the 2. figure of the roote, I set downe the 2. numbers which serueth for th'extraction of the Cube root: viz. 300 30. and against 30. I put the roote already found, which is 2. & against 300. the square therof which is 4. these 2 figurs I set towards the left hand of them, then I multiply 300. by 4. the figure which standeth against it, & the product is 1200. that I seeke how often I may take from 5824. ỹ number ouer ỹ 2 prick, which I may do 4 times, therfore I put 4. in the quotiẽt for the second figure, & vpon the right hand against 300, I set 4. the last found nũber in the quotient, & against 30. I put 16. the square therof: and vnderneath 30. I put 64 which is ỹ Cube of 4. then multiplying al the figures which are in a rowe into one product viz. 4. by 300 maks 1200 & ỹ again by 4. makes 4800. for ỹ product: thẽ for ỹ nert, 2. by 30. makes 60. & that by 16. makes 960. for ỹ second product, which I set down together, each vnder other. lastly because 64. hath no other nũber to be multiplyed therewith, I put that downe vnder them, which done I adde them altogether, and the total summe is 5824. the same substracted from ỹ number ouer the last prick, leaueth nothing, wherby I see that 13824. is a Cubick number, and the Cube

| | | |
|---|---|---|
| | 5 | |
| | 13824 \| 2 | |
| | 8 | |
| 4. | .300. | 4. |
| 2. | ..30. | 16 |
| | 64 | |
| | | 300 |
| | | 4 |
| | 30 | |
| | 2 | 1200 |
| | | 4 |
| | 60 | |
| | 16 | 4800 |
| | 360 | |
| | 60 | |
| | 960 | 4800 |
| | | 960 |
| | | 64 |
| | | 5824 |

Cube roote thereof, is 24. as you may more plainly sæ by the working thereof, which is put in the margins aboue, where you sæ, that 24. being multiplyed into it selfe, and that product againe by 24. the first Multiplyer, the Product is 13824. wich is equall to the first giuen number.

5
1 3 8 2 4 | 24
8
5824

24
24
96
48
576
24
2304
1152
13824

Againe, seeing that examples are the easiest Methode of teaching, & plainest for vnderstanding; let 12551868224 bee a giuen Number: Whereof I would extract the Cube roote: first hauing prickt it, & drawne a quotient for the root, thus 12551868224. I sæ that the root must consist of foure figures, so many pricks being vnder the giuen nũber: For the finding of which figures, I seek first the greatest Cube nũber in 1 . which is 8. the root whereof being 2. I put in the *quotiẽt*, for the first figure of the root, & substracting 8. ỹ cube thereof, frõ 12. the nũber ouer the first prick, rests 4: thẽ for the second figure of the roote, I put down 300. & 30. the nũbers for ỹ cube root; against 30. I set 2 ỹ roo found: against 300. 4 the square thereof: & *multiplying* 300. by 4.

4
X 2 5 5 1 8 6 8 2 2 4 | 23
8

4 300 3
2 30 9
27

the *product* is 1200. that may be take out of 4551. the nũber ouer the second prick 3. times, therefore I put 3. in the *quotient*; and likewise after 300. & the *square* thereof which is 9. after 30. and the cube thereof which is 27. I put vnder 30: then I *multiply* all the numbers in the first rowe, each by the other, viz. 4. by 300. makes 1200: and the same *product* againe by 3. makes 3600. which I set by it selfe: then againe I *multiple* 2. by 30. is 60. and that againe by 9. makes 540. which I put vnder the other *product*; lastly, because 27. hath no nũber wherewth to be multiplyed,

plied, I set downe likewise vnder both the other and the 3. nũbers being set in order one vnder another, as you see, I add them altogether, and the whole *product* is 4167 the same I substract from 4551. the number ouer the nert prick, & there wil remaine 384. to ioyne with the number ouer the 3. prick; which done, the worke will stand in this order as you see. Now, for the third figure of the root, I put down 300. & 30. as before, and against 30. at the left hand put 23. the roote already found, and against 300. the *square* there of, which is 529. then *multiplying* 529 by 00. the *product* is 158700. which may be twise take itõ 384868 therfore I put 2 in ỹ *quotient*, for the 3. figure of the root, and likewise put 2. to the right hand of 300. and the *square* thereof which is 4. at the right hand of 30. and the cube there of being 8. I put vnder 30. which nũbers will stand as aboue; then *multiplying* all the nũbers in one row each by other, into one *product*: viz. 529. by 300. makes 158700. and that againe by 2. is 317400. for the whole *product* of that rowe, which I set downe by it selfe; then I *multiplie* 23. by 30. is 690. and that againe by 4 is 2760. for the *product* of the secõd row. Lastly, because 8. hath no number with it, I put it downe vnder the other, and then adding all the three summes together, the *product* is 320168; the same taken from 384868. the number ouer the thirde prick, rests for the Number ouer the last pricke, 64700224. and in the *Quotient* is 232. the the whole worke being as you see aboue.

| | | | |
|---|---|---|---|
| | | | 3600 |
| | | | 540 |
| | | | 27 |
| | | | 4167 |
| 4551. | 1868224 | | 3 |
| 8 | | | |
| 4167 | | | |
| 529 | | 300 | |
| 23 | | 30 | |
| 529. | 300 | 2 | |
| 23 | 30 | 4 | |
| | 8 | | |
| | 317400 | | |
| | 2760 | | |
| | 8 | | |
| | 320168 | | |
| 6 | | | |
| 384700 | | | |
| 4551. | 1868224 | | |
| 8 | | 232 | |
| 4167. | | | |
| 320168. | | | |

Now to finde the fourth and last Figure of the roote, I put downe the two numbers againe, which serue for the Cube root, viz: 300. and 30. At the left hand of 30. I put 232. the number in the *quotient*, and at the left hand of 300. I set the *square* of 232. which is 53824. in this order: Then *multiplying* 5384. by 300. the *product*.

| | |
|---|---|
| 53824 | 300 |
| 233 | 30. |

is 16147200. which I seek how often may be had in 64700224 the Numbers remaining ouer the last pricke, that may be done foure times: therefore I put 4. in the *quotiēt*, for the fourth & last figure of the root, and also I set the said foure at the *right hād* of 300. and the *square* therof which is 16. at the *right hand* of 30. & the cube thereof being 64 I put right vnderneth 30 which done all the nūbers will stand as aboue: Then *multiplying* all the numbers in each rowe, into their seuerall *products*; *viz* 53824. by 300. makes 16147200: that againe by 4. is 64588800. which I set by it selfe: Then againe 232. by 30. is 6960. the same *product* by 16. makes 111360. which I put down vnder the other: Lastly, because 64. hath no other number to be *multiplyed* therewith, I put it downe likewise, vnder the other two numbers, and adding the three *products* together, the whole summe thereof will bee 64700224. which being substracted from the Number remayning ouer the laste pricke, leaues nothing: So haue I in the *Quotient* 3324. for the Cube-Roote of 1 5518 8 24. the giuen Number: the whole worke whereof is heere set downe in the margine. For the proofe whereof, If you multiplie the Roote: *viz.* 2324. Cubickely in it selfe, the *product* thereof will be equall with the first giuen number, as in this example.

```
53824 ... 300 .. 4
  232 ... 30 .. 16
          64
64588800
  111360
      64
-----------
64700224
```

```
      6
  4384700
12551.68224.
8          |2324
4167
320168
64700224
-----------
          2324
          2324
-----------
          9296
         4648
        6972
       4648
-----------
       5400976
          2324
-----------
      21603904.
     10801952
    16202 28
    10801952
-----------
    12551868.24.
```

Where you see, that 2324: the Roote beeing multiplyed into it selfe Squarely, and the likewise the whole *Product* therof againe by the same roote. 2324. The totall Summe amounting thereof, is 1.551868224. the first giuen Number.

 But

But when you haue a number giuen to extract the cube roote, and the aforesaid giuen number, bee not a right cube number, whereby you cannot come to any perfect roote thereof, but that there will remaine some fraction or broken number after your saide extraction, onely the manner to extract the neerest roote of a number not cubicall, as most writers doe affirme is thus.

The difference betwirt the cubicke number of the roote, and the Cubicke number of a more number then the Roote, by an vnity, shall be the Denominator to the remainer, one also added thereto: As for Example;

Let 12. bee a Number giuen, which not being a right Cube number, I would finde the neerest roote thereof. First, the greatest cubicke nũber in 12. is 8. the cube roote whereof being 2. I put in the quotient, and substracting 8. the cube thereof from 12. there will rest 4. which 4. being ouer, sheweth that 12. is no cubicke number: therfore adding 1. to 4. makes 5. which I put for the Numerator: & to finde the Denominator thereto, I set downe the cube of 2. the roote found, which is 8. and likewise 27. the cube of 3. which is a number more then the root, by one, then substracting the one from the other, viz: 8 from 27. leaues 19. for the Denominator: By wich reason the nearest cubicke root of 12. is $2.\frac{5}{19}$. which being reduced, & multiplied cubickely, makes $11\frac{4058}{6859}$. the same abbreuiated, makes 11. and very neere $\frac{5}{8}$. and it shuld be 12. therefore the Error is $\frac{3}{8}$. too little; which although in this is no great error, yet in a great summe the error would be very much: Therefore for those which desire a more exact and perfect extraction of the square or cube root, from nũbers not being right square, or Cubicke numbers: M Record in his Whetstone of wit, setteth downe an exact way (but very tedious) which is thus; For the square roote, adde to the giuen nũber so many times 2 ciphers, as you desire the neernesse of the root: and for the Cubick roote so many times 3. ciphers, as you desire the exactnes of the roote thereof: and vnder the said Ciphers, put Pricks, in such order as is before taught; and then marke how many Pricks there is ouer, and besides the Pricks of the giuen nũber: And then extract the roote from all those ciphers in such order as you did before; For if there be one more,

the

the root shall be tenths, and the remainer parts of $\frac{1}{10}$ if there be two points or pricks ouer, more then the giuen number, then the roote shall be hundreths, and the remainer parts of $\frac{1}{100}$ if 3. prickes be ouer, the root shall be thousands, and the remainer parts of $\frac{1}{1000}$ and so you may come to a very nere root but not to any exact or perfect root, vnlesse the giuen number be a right square or cubical number.

A Declaration of the Tables of Long. & Lati. of places following.

The Tables hereafter following, shewing the Long. & Latitu. of places, viz. of Kingdomes, Prouinces, Cities, Iles, Capes, Bayes, Riuers & Mountaines, especially the most principall of them in the whole world, are gathered frō the latest descriptions, maps & charts as well vniuersall as particular: who albeit they differ greatly in Lon. yet in Lat. most of them agree: & also hauing a respect to the beginning of each of their seuerall Lon. they come all to a nere agreement: for some beginning their Lon. at the westermost part of Africa, makes the Lon. of Lond. to be about 10. deg. 20 mi. others beginning at the Canary Ilands, makes the Lon. of Lond. 18. deg. others more westward make it 19. deg. 30. mi. & Iodocus Hondius beginning the Per. at the Ile Pico one of the Azores, makes London to be in Lon. 27 deg. 40 min. but I following M. Emery Mulineux, according to his great Globes, do account the lon. frō the westermost parts of S. Michaels, another Ile of the Azores, the midst of which Ile is 50 min. in lon. & from the westermost part therof, the lon. of London is 25. deg. 40 mi. which in effect is not much different from any of the others: note that the lon. is counted frō the meri. passing ouer the aforesaid place Easterwards into a continuall progression, to the end of 360. which is the whole circumference of the world: latitude is counted from the Equin to the end of 90 deg. on each side thereof: and where the letter S is after number, it shewes the place to haue so many deg. & mi. of South La. all the rest hauing no letter adioyning haue N. la the whole being set in Alphabeticall order, for the readier finding of any place therein contained: and where the longi. and latit. of any kingdome is set downe, noted by this sillable reg. it expresseth the middle thereof: further, at the end of such places as begin with one letter, is left a space wherein ỹ traueller may insert such places wherof the longitude and latitude is to him knowne, and not herein expressed.

# A Table of the Longitude and Latitude of all the notable places of the world.

| A | Longi. | Latit. | |
|---|---|---|---|
| Aberden | 22 21 | 57 21 | |
| Abo | 47 51 | 61 1 | |
| Abragima | 156 1 | 32 41 | |
| Elabrigo | 187 11 | 3 29 | s |
| Acapulco | 276 1 | 18 1 | |
| Acartij an Iland | 329 1 | 52 1 | |
| Azores an Iland | 357 1 | 39 1 | |
| Achaguas | 101 30 | 5 30 | s |
| Acheo | 132 30 | 3 40 | |
| Aden | 82 1 | 13 51 | |
| Adia | 50 11 | 25 1 | s |
| Adu | 105 41 | 5 41 | s |
| Aegpit | 64 1 | 30 1 | |
| Africa reg. | 40 1 | 10 1 | |
| Agonata | 162 21 | 38 1 | |
| Agragam | 144 29 | 8 21 | s |
| Aguada | 173 51 | 7 51 | s |
| Aguada segura | 253 29 | 24 1 | |
| Aguada depozos | 245 20 | 28 0 | |
| Alina a mountaine | 98 41 | 54 20 | |
| Alacranes | 283 1 | 22 1 | |
| Alagoa | 58 41 | 29 41 | s |
| Albion noua | 235 1 | 50 0 | |
| Albiron | 109 29 | 25 29 | |
| Albofera | 35 21 | 8 1 | |
| Alboram | 25 29 | 35 29 | |
| Albrough | 26 25 | 52 20 | |
| Alepo | 72 29 | 38 1 | |
| Alcada | 23 1 | 40 29 | |
| Alexandria | 65 1 | 31 21 | |
| Alexandria | 106 11 | 36 21 | |

| A | Longi. | Latit. | |
|---|---|---|---|
| Algaziu | 16 0 | 29 1 | |
| Algiery | 33 1 | 35 21 | |
| Alguecet | 63 41 | 26 51 | |
| Alicante | 28 41 | 39 1 | |
| Alicoa | 7 41 | 13 21 | S |
| Alicur | 44 21 | 38 29 | |
| Alima | 108 51 | 31 1 | |
| Alleluia | 70 21 | 10 1 | |
| Almedina | 34 1 | 33 41 | |
| Almiria | 26 11 | 37 21 | |
| Alpes a mountaine | 41 29 | 47 29 | |
| Alsigubas | 147 11 | 38 41 | |
| Amazen | 45 29 | 12 41 | |
| Amazons reg | 323 1 | 13 1 | |
| Las amazona | 312 29 | 12 29 | S |
| ammon | 59 41 | 27 11 | |
| amara | 63 30 | 5 0 | |
| amara | 60 10 | 19 20 | S |
| amsterdam | 33 1 | 51 29 | |
| anafi | 19 15 | 33 0 | |
| anarie a mount | 116 0 | 54 29 | |
| ancona | 63 11 | 1 11 | |
| ancona | 43 29 | 43 51 | |
| ambomo | 162 50 | 4 20 | S |
| ambon | 164 30 | 3 40 | S |
| amiona | 75 20 | 12 40 | S |
| andernopoly | 58 11 | 44 41 | |
| S. andra | 170 29 | 12 1 | |
| S. andre | 22 11 | 56 21 | |
| S. andreas | 62 11 | 61 11 | |
| Las a negadas | 296 0 | 50 1 | S |

23 MA 59

| A | Longi. | Latit. |
|---|---|---|
| angier | 24 41 | 47 35 |
| anglesey | 19 51 | 54 0 |
| Anglia reg | 23 0 | 53 0 |
| angolesme | 27 1 | 46 0 |
| anda | 66 0 | 8 10 s |
| angolia | 45 10 | 7 10 s |
| angos | 69 10 | 15 50 s |
| angote reg | 67 1 | 1 6 |
| annibily reg | 134 11 | 63 0 |
| antiochia | 72 30 | 39 0 |
| antiochia | 300 50 | 6 40 |
| antipara | 74 20 | 25 20 s |
| antwerpen | 31 20 | 50 30 |
| apiamia | 61 30 | 43 40 |
| aqua lega | 86 40 | 9 50 s |
| ara | 14 20 | 55 10 |
| arabia felix | 83 0 | 21 0 |
| arabia desert | 77 0 | 30 0 |
| aracam reg | 132 0 | 25 0 |
| arboledas | 272 30 | 25 30 |
| ardaguy | 136 20 | 5 10 s |
| aren | 76 10 | 5 10 |
| argell | 84 30 | 15 0 |
| arglas | 16 30 | 54 20 |
| armenia reg | 76 0 | 41 0 |
| arnoltus mont | 35 0 | 11. 30 s |
| ascention | 353 20 | 18 50 |
| La ascention | 15 30 | 8 0 s |
| ascention | 290 30 | 29 30 |
| asia reg | 130 0 | 55 0 |
| asmery mont | 137 0 | 50 0 |
| aspesa | 52 15 | 44 20 |
| aspezi mount | 100 0 | 50 40 |
| asiria reg | 85 0 | 36 0 |
| astapus fluui | 64 0 | 4 0 |
| asuga | 65 40 | 7 20 |

| A | Longi. | Latit. |
|---|---|---|
| atacama | 303 30 | 32 0 s |
| atalaya | 383 0 | 20 10 |
| atalaia | 291 0 | 29 40 |
| atalaia | 27 50 | 6 20 |
| ataualo | 298 10 | 1 30 s |
| athens | 56 10 | 40 0 |
| auero | 17 30 | 41 10 |
| augustin | 293 0 | 29 50 |
| auignon | 32 40 | 44 40 |
| aulona | 51 20 | 41 40 |
| ausburgh | 38 40 | 48 30 |
| ayaman reg | 82 0 | 25 0 |
| azabar | 75 30 | 51 20 |
| azamor | 18 30 | 32 40 |
| azasy | 17 15 | 32 10 |
| azura a mountaine | 59 0 | 22 40 |
| azzell | 62 40 | 1 30 s |
| amiens | 28 30 | 49 40 |
| arago | 26 0 | 42 0 |

## B

| | | |
|---|---|---|
| Babilon | 82 20 | 33 0 |
| Babell mandell | 80 0 | 12 50 |
| Bachu | 88 50 | 42 0 |
| Bachnapa | 72 0 | 4 0 s |
| Bactriana reg | 115 0 | 38 30 |
| Badaios | 19 40 | 38 30 |
| Bafar | 52 20 | 21 40 s |
| Bagasus a lake | 77 10 | 50 40 |
| Baharam an ile Bayes | 87 20 | 27 30 |
| Bayanegada | 319 50 | 40 20 s |
| Bay de baxos anegados | 321 30 | 39 50 s |

| B | Longi. | Latit. | | B | Longi. | Latit. | |
|---|---|---|---|---|---|---|---|
| Buena baya | 190 20 | 4 40 | s | Belef | 69 0 | 51 40 | |
| Bay de los condos | 320 20 | 43 0 | | Belle Ile | 334 0 | 52 20 | |
| Bay a dalagoa | 56 10 | 32 10 | s | Beliſſe | 21 40 | 47 0 | |
| Bay de ſumos | 240 20 | 36 0 | | Belt | 52 30 | 50 0 | |
| Bay degent grand | 303 0 | 54 0 | s | Bengala reg. | 126 0 | 26 30 | |
| | | | | Benichao | 136 0 | 3 50 | |
| Bay hermoſa | 54 20 | 32 40 | s | Benin regnum | 41 0 | 7 40 | |
| Bay S. Iohan | 309 40 | 40 30 | | Bepirus a mont | 143 0 | 34 0 | |
| Bay de S. Migell | 39 30 | 8 40 | s | Bepirus a riuer | 138 20 | 34 0 | |
| Bay Oceinora | 312 30 | 41 0 | | Berga | 40 10 | 62 50 | |
| Bay de pinos | 233 0 | 44 30 | | Bergen | 30 30 | 60 50 | |
| Bay langos | 18 0 | 37 30 | | Berwicke | 22 50 | 55 50 | |
| Bay de ſaluadeges | 344 0 | 20 0 | s | Bethle | 138 50 | 25 40 | |
| Bayde S. Sebaſtian | 83 20 | 13 20 | s | Baiſer regnum | 50 0 | 4 0 | |
| Bacalaio | 335 4 | 48 28 | | Bialigrod | 58 20 | 47 30 | |
| Bay da reg. | 126 0 | 65 0 | | Bilbao | 23 30 | 43 0 | |
| Bayona | 17 20 | 42 10 | | Blaskey | 12 0 | 51 40 | |
| Bayone | 25 30 | 44 0 | | Blaues | 31 10 | 42 0 | |
| Balgada | 69 30 | 5 0 | | Blauet | 21 15 | 47 50 | |
| Balſera | 82 40 | 31 10 | | Bloe | 5 30 | 67 0 | |
| Bamberg | 39 15 | 50 10 | | Borno regnum | 48 30 | 17 10 | |
| Banda | 164 0 | 4 50 | s | Borutholme | 40 50 | 55 30 | |
| Banda | 111 20 | 15 30 | | Bouenbergen | 34 20 | 56 30 | |
| Bandu | 173 30 | 33 0 | | Brandenberge | 42 30 | 52 50 | |
| Bax de los pargos | 345 30 | 20 0 | s | Braſill | 5 10 | 51 20 | |
| Bianza | 150 0 | 2 50 | s | Braſilia regnum | 345 0 | 10 0 | s |
| Barbada | 320 50 | 19 50 | | Braua | 74 30 | 0 30 | |
| La Barbada | 192 50 | 1 50 | s | Preſt | 20 0 | 48 50 | |
| Barbados | 210 10 | 8 50 | | Breſt | 331 0 | 53 0 | |
| Barlingas | 16 20 | 39 30 | | Bruage | 25 30 | 45 50 | |
| Barnagaſſo reg. | 70 0 | 13 0 | | Bruges | 29 0 | 51 10 | |
| S. Bartholome | 194 30 | 14 0 | | Buda | 48 0 | 47 20 | |
| Baſell | 37 10 | 47 50 | | Burdeaux | 26 0 | 45 10 | |
| Beciaſa | 65 0 | 10 30 | | Briſtow | 22 50 | 51 35 | |
| Becolicus a mont | 56 0 | 26 30 | | Brachipult point in Wales | 21 25 | 53 0 | |
| Beil. | 76 15 | 27 10 | | | | | |

| B C | Longi. | Latit. |
|---|---|---|
| Backapra | 31 0 | 59 50 |
| Bruſſels | 30 50 | 51 0 |
| Barcelona | 28 15 | 41 10 |
| Burlings | 16 0 | 39 38 |
| C | | |
| Capes | | |
| Cape S. Francis | 335 0 | 48 5 |
| Cape de Eſpera | 335 5 | 47 0 |
| Cape Raſo | 334 40 | 46 28 |
| Cape Maſſiſaco | 24 0 | 43 32 |
| Cape de las penes | 21 0 | 43 35 |
| Cape de Alinde | 346 50 | 1 0 |
| Cape del Amber | 83 30 | 2 0s |
| Cape de S. Anton | 289 15 | 22 50s |
| Cape Cleare | 14 10 | 51 9 |
| Cape de S. Antoni | 74 30 | 17 0s |
| Cape de S. Auguſt | 162 0 | 6 30 |
| Cape de S. Auguſt | 354 0 | 8 30s |
| Cape baxo | 328 0 | 4 20 |
| Cape de las baxas | 19 41 | 15 29 |
| Cape bedford | 320 1 | 65 29 |
| Cape blanco | 273 19 | 25 21 |
| Cape blanco | 281 19 | 10 29 |
| Cape blanco | 330 11 | 1 1s |
| Cape blanco | 331 21 | 4 29 |
| Cape blanco | 334 21 | 52 1 |
| Cape blanco | 9 20 | 20 29 |
| Cape blanco | 289 41 | 2 21s |
| Cape blanco | 151 1 | 22 41 |
| Cape braua | 275 1 | 27 29 |
| Cap de breton | 331 1 | 45 41 |
| Cap cameron | 287 21 | 25 41 |
| Cap cantin | 17 1 | 32 11 |
| Cap de S catherina | 41 1 | 1 1s |
| Cap de cro | 31 29 | 42 11 |
| Cap croce | 65 21 | 48 21 |

| C | Longi. | Latit. |
|---|---|---|
| Cap de ſierto | 281 21 | 29 21 |
| cap de ſperance | 324 29 | 51 1 |
| cap de S.domingo | 315 21 | 46 41s |
| cap droſey | 13 1 | 51 11 |
| cape feare | 305 11 | 32 29 |
| cape Felix | 84 29 | 14 11 |
| cap finis Terre | 16 1 | 43 11 |
| cap Florida | 293 21 | 25 29 |
| cap formoſo | 28 1 | 5 1 |
| cap froward | 302 39 | 53 21s |
| cap de gato | 26 39 | 36 51 |
| cap de S. Helena | 326 11 | 36 11s |
| cap de ſantiago | 309 1 | 37 29 |
| cap S. Iohn | 62 29 | 67 29 |
| cap de Krin | 13 1 | 53 41 |
| cap de S.Maria | 77 29 | 24 1s |
| cap de Maio | 82 52 | 15 51s |
| cap de S. Maria | 327 11 | 35 11s |
| cap de S. Maria | 9 41 | 21 41 |
| cap de la mola | 36 51 | 6 29 |
| cabo de nombre de Ieſus | 308 11 | 53 1 |
| cap Ortegall | 18 29 | 44 11 |
| cap de palmas | 348 11 | 1 19s |
| cap S. Paul | 32 0 | 5 50 |
| cap de peſcadores | 277 40 | 28 0 |
| cap del plate | 352 50 | 5 0s |
| cap primero | 42 0 | 2 20s |
| cap de 3 points | 28 30 | 50 20 |
| cap de puntas | 315 20 | 10 40 |
| cap S Roman | 296 40 | 31 40 |
| cap de Razo | 334 30 | 46 20 |
| cap ſalida | 74 0 | 26 10s |
| cap de ſpigiel | 353 20 | 7 20s |
| cap de ſtauola | 12 20 | 54 0 |
| cap de tiburones | 302 0 | 17 0 |

| C | Longi. | Latit. | |
|---|---|---|---|
| cap torig a | 11 30 | 18 20 | |
| cap de las vacas | 53 0 | 33 40 | s |
| cap la vela | 305 10 | 11 50 | |
| cap S. Vincent | 302 20 | 53 40 | s |
| cap de virgin mar | 308 0 | 52 10 | s |
| cap de vittoria | 297 30 | 52 0 | s |
| cap S. Paul | 32 0 | 5 50 | |
| cap de peſcadores | 277 40 | 28 0 | |
| cap del plate | 352 50 | 5 0 | s |
| cap primero | 42 0 | 2 20 | s |
| cap paſſaro | 46 29 | 36 51 | |
| cap rafalgate | 96 21 | 22 21 | |
| cap raſo | 317 41 | 8 0 | |
| cap Roxent | 16 29 | 18 51 | |
| cap roxo | 11 1 | 12 0 | |
| cap of good hope | 50 29 | 35 0 | s |
| cap del ſpirito ſan | 161 11 | 13 11 | |
| cap S. Vincent | 17 0 | 37 0 | |
| cap Verd | 9 51 | 14 29 | |
| cap de bonna viſta | 334 21 | 49 11 | |
| cap Walſingham | 321 1 | 63 41 | |
| camdu reg | 136 1 | 47 0 | |
| cairo | 67 29 | 30 0 | |
| calamita | 67 41 | 48 10 | |
| caldy | 20 1 | 51 40 | |
| calecut | 112 41 | 10 29 | |
| callice in France | 29 10 | 50 40 | |
| calibia reg | 42 10 | 36 20 | |
| california | 245 0 | 30 0 | |
| camanor | 300 20 | 16 30 | s |
| cambaba | 150 0 | 8 10 | s |
| camboa | 19 20 | 8 30 | |
| camboya reg | 142 20 | 11 40 | |
| capiapa | 304 50 | 34 0 | s |
| caſma a riuer | 121 40 | 61 0 | |
| caſtrum portugall | 57 10 | 20 20 | s |

| C | Longi. | Latit. | |
|---|---|---|---|
| Cazan | 86 20 | 56 30 | |
| Chaga | 56 0 | 6 20 | s |
| chialo | 56 20 | 7 0 | s |
| chilimazata | 294 30 | 6 30 | s |
| chio | 58 30 | 40 30 | |
| chiguiſamba | 305 30 | 17 0 | s |
| cirut | 62 40 | 15 30 | s |
| coale | 65 0 | 21 30 | |
| coila | 48 20 | 3 10 | s |
| cora | 85 10 | 19 20 | |
| coronades | 295 30 | 45 0 | s |
| corongo | 302 40 | 14 20 | s |
| corpo ſanto | 84 10 | 7 30 | s |
| cumana | 313 30 | 7 0 | |
| cuſco reg | 297 20 | 13 30 | s |
| cales in Spaine | 20 51 | 36 10 | |
| cambalu | 161 11 | 51 40 | |
| cana | 68 1 | 25 40 | |
| canada | 305 11 | 50 21 | |
| canaria | 9 29 | 27 21 | |
| candia | 59 29 | 35 21 | |
| caraiam regnum | 136 51 | 41 0 | |
| caribanum reg | 310 1 | 5 0 | |
| caribes | 316 11 | 7 0 | |
| cartagena | 300 1 | 11 20 | |
| cartagena | 28 21 | 38 20 | |
| cartago | 299 29 | 3 11 | |
| caſena reg | 38 21 | 17 11 | |
| caſſar reg | 132 1 | 47 1 | |
| cataio reg | 150 1 | 53 1 | |
| catnes | 22 9 | 58 29 | |
| catwicke | 41 11 | 69 11 | |
| ceris | 87 51 | 38 41 | |
| cheſimur reg | 115 0 | 29 0 | |
| cheſter in England | 21 29 | 53 51 | |
| chicheſter | 24 11 | 51 0 | |

| C D | Longi. | Latit. |
|---|---|---|
| chidlies cape | 326 41 | 67 29 |
| chily reg | 305 0 | 30 1 S |
| chirman reg | 96 0 | 26 29 |
| ciartiam reg | 136 29 | 51 1 |
| cinna | 67 1 | 41 21 |
| cirena | 53 29 | 32 0 |
| ciprus | 68 40 | 37 30 |
| clearmont | 30 55 | 45 51 |
| cocas a mountaine | 79 0 | 47 29 |
| cochin | 114 0 | 9 14 |
| collao reg | 310 0 | 16 0 S |
| colmogory | 62 41 | 63 41 |
| colne | 34 0 | 51 41 |
| commania reg | 86 0 | 51 0 |
| congu | 147 21 | 49 11 |
| cominxberg | 49 11 | 55 29 |
| conſtantinople | 61 10 | 44 40 |
| coppen hage | 38 29 | 55 51 |
| corafau reg | 108 1 | 37 0 |
| corcke in Ireland | 15 41 | 51 41 |
| cor fu an Iland | 22 0 | 39 29 |
| corinth | 54 21 | 39 0 |
| corſica | 38 11 | 42 0 |
| cotum reg | 130 0 | 51 0 |
| cracow | 48 29 | 50 0 |
| cuba | 296 0 | 31 41 |
| E. of cumb. Iles | 316 0 | 63 21 |
| cuſitan reg | 87 0 | 32 0 |
| conough | 15 35 | 53 45 |
| cambridge | 25 50 | 52 14 |
| **D** | | |
| Dangali reg | 78 0 | 11 0 |
| Dangara | 53 50 | 10 50 S |
| Dauma reg | 34 20 | 8 0 |
| Debſan | 52 10 | 13 30 S |
| Dembia | 56 0 | 3 0 S |

| D | Longi. | Latit. |
|---|---|---|
| Dwina | 74 30 | 62 10 |
| Dageroort | 48 41 | 59 41 |
| Dalacia | 77 0 | 14 21 |
| Damaſcus | 74 29 | 35 0 |
| Dantzick | 46 0 | 55 0 |
| L. Darcies Ile | 327 51 | 68 21 |
| Delli reg | 114 0 | 18 29 |
| Derwinda | 47 51 | 57 29 |
| Deuenter | 33 25 | 51 51 |
| Diep | 28 41 | 49 29 |
| Dires cape | 321 29 | 64 51 |
| Dominica | 319 41 | 14 0 |
| Don a riuer | 75 0 | 53 21 |
| Doneez a riuer | 71 0 | 51 0 |
| Dorow | 58 0 | 51 29 |
| Douer | 28 11 | 51 0 |
| Drongenes | 4 29 | 66 29 |
| Drin | 50 0 | 45 0 |
| Dubdu | 25 0 | 32 51 |
| Dubino | 35 21 | 54 0 |
| Dublin | 16 41 | 53 11 |
| Dumaran | 150 0 | 8 41 |
| Duy | 34 29 | 59 21 |
| Duyhe | 56 29 | 50 29 |
| Dams ſtraights | 324 1 | 64 0 |
| Darby | 24 5 | 52 55 |
| Dunkerke | 29 10 | 51 12 |
| **E** | | |
| Ebaida | 60 1 | 25 29 |
| Ecſonen | 30 15 | 58 11 |
| Edenbrough | 22 1 | 55 51 |
| Elgent | 80 0 | 17 20 |
| Ely | 25 20 | 52 40 |
| Eliobon | 72 0 | 27 0 |
| Elior | 26 20 | 10 10 |
| Qu. Eliza. forland | 337 0 | 61 30 |

| EF | Longi. | Latit. |
|---|---|---|
| Emden | 34 10 | 53 10 |
| Ens | 43 0 | 48 30 |
| Ens | 74 10 | 37 30 |
| Ephesus | 60 30 | 39 40 |
| Ergas | 86 0 | 38 0 |
| Ergimul | 45 0 | 59 0 |
| Euboya | 56 10 | 41 0 |
| Euphrates | 76 40 | 40 0 |
| Europa reg. | 55 0 | 51 0 |
| Exeter | 22 10 | 50 0 |
| Enchuisen | 21 40 | 52 54 |
| F | | |
| Falckzin | 57 20 | 47 0 |
| Falsterhode | 40 0 | 56 0 |
| Famagosta | 69 20 | 57 30 |
| Farrallones | 294 20 | 11 40 s |
| Fargana | 114 40 | 46 0 |
| Farre | 16 20 | 61 30 |
| Cape Fatache | 86 50 | 15 40 |
| Faso | 75 50 | 45 40 |
| Farnasa | 38 10 | 30 10 |
| Fayll | 356 0 | 38 40 |
| Fernandobucke | 351 40 | 9 20 s |
| Fees reg. | 21 50 | 32 50 |
| Fierro | 6 20 | 26 30 |
| Finmarke | 47 0 | 69 30 |
| Flambroughead | 20 | 54 0 |
| Flensburgh | 36 40 | 55 0 |
| Fleccory | 32 0 | 58 0 |
| Flye | 32 0 | 53 33 |
| Florence | 41 10 | 43 40 |
| Flores Iland | 353 40 | 39 20 |
| Florida reg, | 292 0 | 31 0 |
| Focen | 38 40 | 46 30 |
| La Formanos | 310 30 | 60 40 |
| Formentera | 31 10 | 38 50 |

| FG | Longi. | Latit. |
|---|---|---|
| Forteuentura | 11 0 | 28 0 |
| Foyl | 15 50 | 55 30 |
| Frayles | 314 30 | 11 20 |
| Franckfort | 36 30 | 50 0 |
| Frisland | 351 30 | 62 0 |
| Frobishers stay | 331 20 | 64 0 |
| A furious ouer fall | 322 30 | 60 0 |
| Farre Ilands | 20 0 | 62 10 |
| Farhill Ile | 24 45 | 60 0 |
| G | | |
| Gago regnum | 25 0 | 8 30 |
| Galathia | 37 20 | 37 0 |
| Gambra a riuer | 12 0 | 13 10 |
| Gane | 30 20 | 50 40 |
| Garamantica | 51 30 | 16 0 |
| Garnsey | 22 20 | 49 40 |
| Gaza | 70 50 | 33 10 |
| Gamba | 64 40 | 17 30 s |
| Gargiza | 72 40 | 12 0 s |
| Gemanacota | 118 40 | 6 0 |
| Geneua | 33 40 | 46 20 |
| Genua | 37 50 | 45 0 |
| Genua | 15 20 | 16 0 |
| Gerguth reg. | 153 0 | 57 0 |
| Germanareo | 40 0 | 51 0 |
| Gerseluin | 24 30 | 32 20 |
| Gestreg | 106 30 | 26 0 |
| Genera | 7 30 | 26 30 |
| Ghir a riuer | 25 30 | 22 0 |
| Ghir a desert | 24 0 | 22 0 |
| Giamber | 18 1 | 33 41 |
| Gilan | 94 1 | 39 21 |
| Gilberts sound | 326 51 | 67 1 |
| Giras a riuer | 41 21 | 20 11 |

| G | Longit. | Latit. | |
|---|---|---|---|
| Galloway | 15 49 | 53 15 | |
| Goa | 112 21 | 14 41 | |
| Godia | 22 30 | 18 11 | |
| Gloſgow | 29 0 | 57 0 | |
| Golfo de benngal | 125 0 | 15 0 | |
| Golfo de ſ. Helen | 484 1 | 33 29 | S |
| Golfo de la India | 442 1 | 34 1 | S |
| Golf: de los negi. | 350 30 | 2 0 | S |
| Golfo del Rey | 40 41 | 5 30 | S |
| Golfo de todos Santos. | 345 30 | 1 41 | |
| Golfo de ſ. Anton | 46 20 | 26 0 | S |
| Golfo frio. | 45 30 | 20 0 | S |
| Golfo delpapagai | 278 30 | 12 30 | |
| Gorage Reg: | 69 0 | 2 0 | |
| Goram | 58 15 | 28 30 | |
| Goteland | 45 21 | 57 30 | |
| Gozo | 58 20 | 34 41 | |
| Granda | 318 20 | 11 0 | |
| Granata | 23 30 | 38 0 | |
| Gretia Reg: | 54 0 | 49 0 | |
| Gratioſa | 357 30 | 39 2 | |
| Groninghen | 32 11 | 53 0 | |
| Groenland | 0 0 | 75 0 | |
| Groy | 21 0 | 47 21 | |
| Guber Reg. | 27 0 | 9 0 | |
| Guangera Reg: | 44 0 | 13 41 | |
| Gudan | 48 21 | 85 1 | |
| Guinea noua. | 180 0 | 5 0 | S |
| Guinea Reg: | 18 0 | 9 0 | |
| Gulye | 33 30 | 50 41 | |
| Gunagona | 67 30 | 6 0 | |
| Guſtina | 109 30 | 56 11 | |
| gibralterſtraights | 21 0 | 35 2 | |

| H | Longit. | Latit. | |
|---|---|---|---|
| Hales Iland | 337 51 | 63 0 | |
| Haliber | 78 41 | 21 10 | |
| Hallicz | 52 51 | 48 41 | |
| Hambrough | 37 11 | 53 21 | |
| Hartlepole | 24 0 | 55 21 | |
| Harwich | 27 29 | 52 0 | |
| Hauana | 292 11 | 20 0 | |
| Hebrides | 15 20 | 58 0 | |
| Heydelberg | 36 0 | 49 0 | |
| Heiſt | 23 29 | 46 29 | |
| Heiſhant | 19 29 | 48 41 | |
| Heptapolis | 324 29 | 25 21 | |
| Hercules pillars | 6 21 | 32 11 | |
| Helichland | 33 51 | 66 0 | |
| Hercania Reg: | 100 0 | 40 0 | |
| Hiſpanio Reg; | 2 0 | 40 0 | |
| Noua Hiſpania | 280 0 | 13 29 | |
| Hiſpaniola | 306 0 | 18 29 | |
| Holindall | 36 11 | 51 1 | |
| Homey | 61 30 | 52 51 | |
| Hontsſoort | 48 30 | 59 1 | |
| Horne | 12 10 | 66 10 | |
| Hull | 25 21 | 53 41 | |
| Hungaria | 50 0 | 48 1 | |
| Hidaſpes a Riuer | 124 0 | 33 21 | |
| Hipaſis a riuer | 124 0 | 33 1 | |
| Helin head | 15 2 | 55 15 | |
| Hereford | 12 38 | 52 12 | |
| heele of danthick | 46 10 | 55 40 | |
| I | | | |
| Iacuby a Riuer | 64 1 | 8 1 | |
| Iadye | 58 21 | 14 1 | |
| Iamaica | 238 29 | 7 1 | |
| Iambut | 72 29 | 26 29 | |
| Iarchem Reg: | 117 29 | 44 1 | |

| I | Longit. | Latit. | |
|---|---|---|---|
| Iapones | 169 0 | 35 1 | |
| Iarley Iland | 23 0 | 19 20 | |
| Iaua maior | 140 0 | 9 0 | S |
| Iaua minor | 150 0 | 9 0 | S |
| Iazin | 77 30 | 20 30 | |
| Iapara | 141 20 | 7 40 | |
| Ierico | 73 1 | 33 0 | |
| *Ieruſalem* | 72 21 | 31 0 | |
| Ilmens a Riuer | 105 0 | 27 0 | |
| Imaus a Mountaine. | 128 0 | 39 0 | |
| India Orientall | 135 0 | 26 0 | |
| Indus, a Riuer | 115 29 | 26 0 | |
| Inſpurg Ilands. | 40 41 | 47 50 | |
| The three Ilands | 169 21 | 2 0 | S |
| Ile de don Alphõſo *de Aluarez* | 202 8 | 8 0 | |
| Ile d'eaues | 310 30 | 11 20 | |
| Ile des eaues | 173 50 | 4 30 | |
| Ile de bartinado | 293 30 | 10 30 | |
| Ile braua | 1 20 | 2 20 | |
| Iſlas de corales | 194 40 | 9 50 | |
| Ile deſierto | 178 0 | 31 1 | |
| Ile del Fuego | 22 | 14 21 | |
| Ile de los fuegos | 181 29 | 2 41 | |
| Ile del los Galopegos maiores | 281 10 | 4 0 | |
| Ile de los Galopegos minores | 277 30 | 1 10 | |
| Ile de nombres blancos. | 169 20 | 5 41 | S |
| Ile de *S. Iago* | 158 20 | 8 1 | |
| Ile de *S. Iuan.* | 325 29 | 42 30 | |
| Ile de *los ladrones* | 177 21 | 15 1 | |
| Ile de *los Lobos* | 307 41 | 40 21 | |

| I | Longit. | Latit. | |
|---|---|---|---|
| Ile *de S. Maria.* | 296 29 | 37 2 | S |
| Ile de martin vaz | 10 41 | 21 41 | |
| Ile de May | 4 29 | 15 29 | |
| Ile *S. Michael* | 0 0 | 29 29 | |
| Ile de Negros | 155 29 | 10 29 | |
| Iland of fowles | 33 40 | 5 0 | |
| Ile de Orliance | 31 40 | 50 29 | |
| Ile de paiaros | 314 0 | 12 41 | |
| Ile de Palmis | 163 21 | 6 0 | |
| Ile de paxaros | 198 51 | 8 51 | |
| Ile de paxaros | 234 21 | 28 0 | |
| Ile of pearles | 203 11 | 7 0 | |
| Ile de pinos | 292 21 | 21 29 | |
| Ile de rees | 1 20 | 25 21 | |
| Ile of ſalt | 411 | 16 29 | |
| *Salomons* Iland | 204 0 | 10 0 | |
| Ile of the Sunne | 547 41 | 10 29 | |
| Ile *S. Thome* | 38 0 | 0 0 | |
| Ile *S. Thomas* | 252 0 | 20 11 | |
| Ile de verde | 353 51 | 45 29 | |
| Ile de *S. Vincent* | 175 50 | 8 0 | |
| Ile de S. *Vincent* | 73 21 | 20 29 | |
| Ile de *S. Catalina.* | 334 10 | 27 30 | S |
| Ile de Cedros | 240 30 | 29 50 | S |
| Ile de farnan. laro | 354 20 | 2 20 | |
| Ile de lima | 295 10 | 22 30 | S |
| Ile ſecas | 76 20 | 29 30 | S |
| Ile de Triſtan de Acunia. | 26 30 | 36 0 | S |
| Ioam | 135 0 | 7 29 | S |
| Iolofo Reg: | 24 29 | 6 0 | |
| Ipſwitch | 27 12 | 52 22 | |
| Ioppe | 71 21 | 4 0 | |
| Iſabella | 305 21 | 18 51 | |
| Iſland | 8 0 | 66 0 | |
| *Italie Reg:* | 42 29 | 43 0 | |

| I K L | Longi. | Latit. |
|---|---|---|
| Ireland | 16 0 | 53 29 |
| Iucatan Reg: | 283 0 | 18 0 |
| Iugor | 138 0 | 7 50 |
| Iuica | 31 21 | 39 30 |
| Iulibella | 61 0 | 1 30 |
| **K** | | |
| Kalmuchy, in *Tartaria.* | 9 5 | 51 0 |
| Kaniow | 63 40 | 51 10 |
| Karakithath Reg: | 119 0 | 51 0 |
| Kartzef | 67 20 | 53 0 |
| Kargapele | 166 30 | 61 50 |
| Kasakky Tartaria | 103 0 | 51 0 |
| Kiow | 62 20 | 51 10 |
| Kithais Reg: | 110 0 | 57 0 |
| Kithaya Lake | 123 31 | 53 0 |
| Kola | 54 51 | 69 0 |
| Kolenig | 4 11 | 65 10 |
| Kosar a Riuer | 96 40 | 49 0 |
| Kintaile | 19 9 | 56 45 |
| Kinsaile | 5 3 | 52 35 |
| **L** | | |
| Lacierna | 24 50 | 39 30 |
| Ladena | 53 03 | 41 31 |
| Ladoga | 62 11 | 61 40 |
| Lago de los Coronados | 295 1 | 44 0 |

| L | Longi. | Latit. |
|---|---|---|
| Laia | 45 29 | 64 10 |
| Lampesa | 36 21 | 33 0 |
| Lancerrota | 11 4 | 29 30 |
| Lanow | 51 11 | 52 20 |
| Laredo | 22 51 | 43 0 |
| Lariſſa | 70 0 | 33 0 |
| Larta | 53 0 | 46 0 |
| Lake de gouleme | 306 40 | 48 • |
| Lacus Armibus | 131 0 | 60 10 |
| Lacus ſalſus | 137 40 | 47 30 |
| Leeknes | 3 29 | 58 |
| Leon | 21 11 | 42 1 |
| Leon | 283 41 | 11 21 |
| Leopolis | 52 51 | 49 2 |
| Lepin | 98 0 | 58 41 |
| Leguio maior | 165 0 | 28 0 |
| Leguio minor | 158 41 | 22 0 |
| Lerida | 28 21 | 41 30 |
| Leſter point | 335 0 | 62 0 |
| Lima | 296 41 | 23 30 |
| Limonia | 72 11 | 44 20 |
| Limoſa | 43 29 | 4 50 |
| Lyons | 32 41 | 45 40 |
| Lyorne | 40 21 | 43 30 |
| Lisboa | 17 29 | 39 11 |
| Lyzard | 18 20 | 50 10 |
| London | 25 50 | 51 40 |
| London coaſt | 326 21 | 72 0 |
| Lepeſo | 74 1 | 49 41 |
| Loyre a Riuer | 244 | 47 41 |
| Longſound | 24 20 | 58 5 |
| Lubecke | 382 | 53 51 |
| Lucka | 42 11 | 2 |
| Luky | 6 0 | 58 21 |
| L Lumleys Inlet | 1200 | 61 |

| L | Longi. | Latit. |
|---|---|---|
| Luna a Mountaine. | 60 0 | 16 0 |
| Lundy | 19 2 | 51 0 |
| Lutzko | 54 0 | 50 21 |
| Luſon an Iland. | 156 0 | 17 0 |
| Lybia | 33 0 | 23 30 |
| Lin | 26 25 | 52 48 |
| Lincolns. | 25 25 | 53 22 |

| M | | |
|---|---|---|
| Maboga | 64 41 | 13 30 |
| Machian | 160 41 | 0 29 |
| Machoenta | 39 51 | 33 51 |
| Macſin Ilands | 93 30 | 75 30 |
| Macyra an Iland | 62 0 | 19 40 |
| Lamadalena | 44 41 | 7 0 |
| Madera Ilands | 8 11 | 31 29 |
| Mæatis palus | 71 30 | 40 29 |
| Magadaxo | 78 0 | 5 11 |
| Magalo | 71 20 | 9 29 |
| Maida | 2 40 | 46 29 |
| Magallanes ſtreights | 305 0 | 53 25 |
| Maiorca Iland | 39 51 | 33 0 |
| Malibrigo | 178 51 | 26 0 |
| malaca regnum | 136 30 | 2 51 |
| Malaga | 23 51 | 37 21 |
| Maldauaran Ilād | 113 0 | 3 0 |
| Malorca | 39 51 | 32 51 |
| Malta Iland | 46 0 | 35 31 |
| Man an Iland | 19 0 | 54 51 |

| M | Longi | Latit. |
|---|---|---|
| Mau:tenga reg | 77 0 | 22 21 |
| Mandao reg | 121 0 | 25 0 |
| Mangeſia | 61 29 | 41 29 |
| Mangior china | 150 0 | 37 0 |
| Manica | 62 51 | 23 29 |
| Manicongo reg | 46 41 | 5 0 |
| Maniola Iland | 1 0 30 | 2 0 |
| Marchant Ile | 32 0 | 68 21 |
| Mare de bachuor the caſpium ſea | 92 0 | 45 0 |
| Mare congelatum | 345 0 | 4 0 |
| Mare de India | 120 0 | 10 0 |
| Mare maior | 68 0 | 46 0 |
| Mare medeterenium. | 50 0 | 35 0 |
| Mare rubrum. the red ſea | 75 0 | 20 0 |
| Mare vermeyo | 255 0 | 26 0 |
| Mare delzur | 2 0 0 | 10 0 |
| Margarita | 314 11 | 0 50 |
| Marigalante | 320 0 | 1 50 |
| Marnios | 306 21 | 40 40 |
| Marrocco | 20 0 | 30 29 |
| Marcellis | 33 51 | 43 40 |
| Maſalio | 23 29 | 30 20 |
| Milford hauen | 20 5 | 51 48 |
| Maſtagan | 30 21 | 35 20 |
| Mazaker | 1 9 0 | 33 0 |
| Madagaſcar | 7 0 | 19 5 |
| Marae apana | 312 10 | 8 0 |
| Meander a mountaine | 152 0 | 31 30 |
| Maleſtream | 6 0 | 67 22 |
| Meb | 46 29 | 44 0 |
| Medina cely | 23 29 | 41 10 |
| Medina talnaby | 73 0 | 27 20 |

| M | Longit. | Latit. | |
|---|---|---|---|
| Medino | 98 29 | 36 29 | |
| Midleburgh | 29 40 | 52 0 | |
| Meiſſen | 41 0 | 51 10 | |
| Melinde reg | 71 21 | 3 20 | S |
| Melley reg | 15 41 | 12 0 | |
| Meluing | 48 1 | 54 50 | |
| Ments | 35 51 | 50 0 | |
| Meſhet | 85 29 | 52 50 | |
| Meſepotamia | 78 1 | 35 0 | |
| Meſſana | 45 51 | 37 50 | |
| Metz | 33 29 | 49 45 | |
| Mien reg | 136 1 | 31 0 | |
| Miens kow | 56 41 | 54 50 | |
| Millan | 38 29 | 46 10 | |
| Minorca Ile | 34 29 | 40 0 | |
| Modon | 53 21 | 37 0 | |
| Moguer | 20 0 | 37 50 | |
| Noldauia reg | 55 0 | 46 0 | |
| Molines | 30 21 | 47 40 | |
| Mollucca Ilands | 160 41 | 1 0 | |
| Memorancie | 136 0 | 47 0 | |
| Momphelier | 31 29 | 44 10 | |
| Mongull reg | 160 0 | 61 30 | |
| Monte de branid. | 47 11 | 30 15 | S |
| Mont fragoſo | 344 0 | 12 0 | |
| Montnegro | 44 41 | 17 0 | |
| Mont raleigh | 320 20 | 65 0 | |
| Mont royall | 301 0 | 45 40 | |
| Morea reg | 54 30 | 38 0 | |
| Moſaik | 68 50 | 55 0 | |
| Moſambique reg | 70 20 | 14 40 | |
| Moſcouia reg | 80 0 | 59 0 | |
| Moskow | 70 30 | 35 0 | |
| Moſſa | 84 30 | 35 0 | |
| Moſull | 84 0 | 34 50 | |
| Mozena | 24 20 | 34 30 | |

| N M | Longit. | Latit. |
|---|---|---|
| Moſeenek | 69 50 | 51 30 |
| Munſter | 35 0 | 52 10 |
| **N** | | |
| Nebarz | 79 50 | 50 50 |
| Naygay in Tartar | 97 0 | 53 30 |
| Naym | 94 10 | 33 40 |
| Nayman reg | 140 0 | 64 0 |
| Naynen | 31 10 | 50 0 |
| Nantes | 24 10 | 47 50 |
| Napoly | 45 0 | 41 0 |
| Napoly | 55 10 | 38 0 |
| Napthaly | 73 0 | 34 30 |
| Narbona | 30 20 | 43 20 |
| Nardenborg | 47 10 | 67 50 |
| Narue | 56 10 | 60 0 |
| Naruare | 21 55 | 42 39 |
| Naſeph | 110 30 | 43 0 |
| Natolia reg | 66 0 | 41 0 |
| Nazareth | 72 40 | 34 10 |
| Nerpis | 45 30 | 62 50 |
| Neunon | 57 10 | 64 20 |
| Newcaſtle | 23 10 | 55 20 |
| Nicarea | 59 30 | 39 30 |
| Nicober an Iland, | 130 30 | 16 40 |
| Nicomedia | 63 30 | 44 20 |
| Nicopolis | 56 30 | 45 0 |
| Nieflot | 57 40 | 59 50 |
| Nilus a riuer | 67 20 | 32 0 |
| Ninus | 82 20 | 37 0 |
| Niſa | 36 10 | 44 0 |
| Niſſa | 45 30 | 50 30 |
| Naze in Norway | 31 0 | 58 5 |
| Noes a mountaine | 81 0 | 40 21 |
| Nolon | 30 0 | 49 22 |
| Nombre de dyos | 294 29 | 9 22 |

| L | Longi. | Latit. |
|---|---|---|
| Luna a Mountaine. | 60 0 | 16 0 |
| Lundy | 19 2 | 51 0 |
| Lutzko | 54 0 | 50 21 |
| Luſon an Iland. | 156 0 | 17 0 |
| Lybia | 33 0 | 23 30 |
| Lin | 26 25 | 52 48 |
| Lincolns. | 25 25 | 53 22 |

| M | Longi | Latit. |
|---|---|---|
| Mau tenga reg | 77 0 | 22 21 |
| Mandao reg | 121 0 | 25 0 |
| Mangeſia | 61 29 | 41 29 |
| Mangior china | 150 0 | 37 0 |
| Manica | 62 51 | 23 29 s |
| Manicongo reg | 46 41 | 5 0 s |
| Maniola Iland | 1.0 30 | 2 0 |
| Marchant Ile | 32 0 | 68 21 |
| Mare de bachuor the caſpium ſea | 92 0 | 45 0 |
| Mare congelatum | 345 0 | 64 0 |
| Mare de India | 1200 | 10 0 |
| Mare maior | 68 0 | 46 0 |
| Mare medetere- | 50 0 | 25 0 |

| M | | |
|---|---|---|
| Maboga | | 0 |
| Machian | | |
| Machoenta | | 0 |
| Macſin Ilands | | 0 |
| Macyra an Ila | | 50 |
| Lamadalena | | 50 |
| Madera Iland | | 40 |
| Mæatis palus | | 25 |
| Magadaxo | | 40 |
| Magalo | | 20 |
| Maida | | 48 |
| Magallanes ſtreights | | |
| Maiorca Iland | 39 51 | 33 0 |
| Malibrigo | 178 51 | 26 0 |
| malaca regnum | 136 30 | 2 51 |
| Malaga | 23 51 | 37 21 |
| Maldauaran Ilād | 113 0 | 3 0 |
| Malorca | 39 51 | 32 51 |
| Malta Iland | 46 0 | 35 31 |
| Man an Iland | 19 0 | 54 51 |
| Mazaker | 190 | 33 0 |
| Madagaſcar | 7 0 | 19 5 |
| Marae apana | 312 10 | 8 0 |
| Meander a mountaine | 152 0 | 31 30 |
| Maleſtream | 6 0 | 67 22 |
| Meb | 46 29 | 44 40 |
| Medina cely | 23 29 | 41 10 |
| Medina talnaby | 73 0 | 27 20 |

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| M | Longit. | Latit. | |
|---|---|---|---|
| Medino | 98 29 | 36 29 | |
| Midleburgh | 29 40 | 52 0 | |
| Meiſſen | 41 0 | 51 10 | |
| Melinde reg | 71 21 | 3 20 | S |
| Melley reg | 15 41 | 12 0 | |
| Meluing | 48 1 | 54 50 | |
| Ments | 35 51 | 50 0 | |
| Meſhet | 85 29 | 52 50 | |
| Meſepotamia | 78 1 | 35 0 | |
| Meſſana | 45 51 | 37 50 | |
| Metz | 33 29 | 49 45 | |
| Mien reg | 136 1 | 31 0 | |
| Miens kow | 56 41 | 54 50 | |
| Millan | 38 29 | 46 10 | |
| Minorca Ile | 34 29 | 40 0 | |
| Modon | 53 21 | 37 0 | |
| Mogues | 20 0 | 37 50 | |
| Noldauia reg | 55 0 | 46 0 | |
| Molines | 30 21 | 47 40 | |
| Mollucca Ilands | 160 41 | 1 0 | |
| Memorancie | 136 0 | 47 0 | |
| Momphelier | 31 29 | 44 10 | |
| Mongull reg | 160 0 | 61 30 | |
| Monte de branid. | 47 11 | 30 15 | S |
| Mont fragoſo | 344 0 | 12 0 | |
| Montnegro | 44 41 | 17 0 | |
| Mont raleigh | 320 20 | 65 0 | |
| Mont royall | 301 0 | 45 40 | |
| Morea reg | 54 30 | 38 0 | |
| Moſaik | 68 50 | 55 0 | |
| Moſambique reg | 70 20 | 14 40 | |
| Moſcouia reg | 80 0 | 59 0 | |
| Moskow | 70 30 | 35 0 | |
| Moſſa | 84 30 | 35 0 | |
| Moſull | 84 0 | 34 50 | |
| Mozena | 24 20 | 34 30 | |

| N M | Longit. | Latit. |
|---|---|---|
| Moſeenek | 69 50 | 51 30 |
| Munſter | 35 0 | 52 10 |
| N | | |
| Nebarz | 79 50 | 50 50 |
| Naygay in Tartar | 97 0 | 53 30 |
| Naym | 94 10 | 33 40 |
| Nayman reg | 140 0 | 64 0 |
| Naynen | 31 10 | 50 0 |
| Nantes | 24 10 | 47 50 |
| Napoly | 45 0 | 41 0 |
| Napoly | 55 10 | 38 0 |
| Napthaly | 73 0 | 34 30 |
| Narbona | 30 20 | 43 20 |
| Nardenborg | 47 10 | 67 50 |
| Narue | 56 10 | 60 0 |
| Naruare | 21 55 | 42 39 |
| Naſeph | 110 30 | 43 0 |
| Natolia reg | 66 0 | 41 0 |
| Nazareth | 72 40 | 34 10 |
| Nerpis | 45 30 | 62 50 |
| Neunos | 57 10 | 64 20 |
| Newcaſtle | 23 10 | 55 20 |
| Nicarea | 59 30 | 39 30 |
| Nicober an Iland, | 130 30 | 16 40 |
| Nicomedia | 63 30 | 44 20 |
| Nicopolis | 56 30 | 45 0 |
| Nicflot | 57 40 | 59 50 |
| Nilus a riuer | 67 20 | 32 0 |
| Ninus | 82 20 | 37 0 |
| Niſa | 36 10 | 44 0 |
| Niſſa | 45 30 | 50 30 |
| Naze in Norway | 31 0 | 58 5 |
| Noes a mountaine | 81 0 | 40 21 |
| Nolon | 30 0 | 49 22 |
| Nombre de dyos | 294 29 | 9 22 |

| N O | Longi. | Latit. |
|---|---|---|
| Nomedalen | 33 26 | 65 29 |
| Normar | 38 2 | 61 21 |
| Norom bega | 315 41 | 43 41 |
| Norweigh | 35 0 | 62 2 |
| Nouogradec | 57 11 | 53 2 |
| Nowgrod | 65 29 | 52 41 |
| Nowgorod | 62 51 | 60 29 |
| Nowgorod | 80 2 | 55 21 |
| Nubia reg | 57 2 | 13 0 |
| Nubia a riuer | 57 2 | 15 41 |
| Nuremberg | 39 29 | 49 29 |
| Norwich | 27 15 | 52 45 |
| **O** | | |
| Oby a riuer | 107 1 | 60 0 |
| Occa a riuer | 77 29 | 55 41 |
| Olant | 43 29 | 57 0 |
| Olleron | 24 29 | 45 29 |
| Olone | 24 29 | 47 0 |
| Omagua reg | 130 1 | 9 0 S |
| Omba | 54 11 | 66 51 |
| Onega a riuer | 56 41 | 64 0 |
| Onegaburg | 59 29 | 62 29 |
| Opakow | 64 29 | 53 29 |
| Orchades Iles | 22 11 | 59 2 S |
| Orellana | 343 11 | 3 2 |
| Orixa reg | 119 1 | 19 2 |
| Orleaus | 28 29 | 48 2 |
| Ormus Ile | 91 21 | 27 29 |
| Orsa | 59 51 | 54 21 |
| Orsa | 41 21 | 61 29 |
| Ortona | 44 29 | 42 40 |
| Otronto | 49 29 | 40 21 |
| Oxenford | 24 0 | 52 0 |
| Oya reg | 75 0 | 13 0 |

| O P | Longi. | Latit. |
|---|---|---|
| Ostend | 29 29 | 51 29 |
| Orenge | 30 35 | 43 35 |
| Oriyance | 27 52 | 47 42 |
| Oldfound | 31 36 | 61 35 |
| Orfordnes | 28 0 | 52 15 |
| **P** | | |
| Paganſa | 99 51 | 45 0 |
| Paito | 290 30 | 5 10 S |
| Palagoſa | 47 29 | 43 0 |
| Palandura Iland | 10 8 | 11 0 |
| palatia | 60 51 | 39 21 |
| palma Iland | 6 21 | 28 0 |
| palona | 105 10 | 2 0 S |
| pancer | 120 0 | 41 0 |
| pampalona | 24 29 | 42 41 |
| panama | 394 29 | 8 11 |
| pantanalia | 42 50 | 36 29 |
| panuco | 270 10 | 22 20 |
| pauia | 270 11 | 22 21 |
| patricks purgato. | 15 52 | 54 32 |
| parris | 29 25 | 48 29 |
| parma | 39 20 | 45 11 |
| paſſan | 41 50 | 48 41 |
| paura | 37 51 | 46 11 |
| paznaſu | 155 29 | 54 51 |
| pechora | 66 51 | 67 0 |
| pechora Caſtle | 73 51 | 64 51 |
| pegu reg | 135 0 | 20 11 |
| peim regnum | 132 0 | 51 29 |
| perigo | 323 11 | 43 21 |
| pernou | 53 29 | 58 41 |
| peru reg | 296 0 | 10 0 S |
| peruſia | 142 21 | 43 11 |
| peſcara | 34 29 | 30 11 |
| phillippina Iland | 158 1 | 15 0 |

| P | Longi. | Latit. | |
|---|---|---|---|
| Pico | 356 41 | 38 21 | |
| Picora regnum | 317 0 | 10 2 | s |
| Pigmea | 148 41 | 32 2 | |
| pinisko | 55 0 | 52 2 | |
| pilingu | 144 21 | 40 2 | |
| pina | 296 21 | 3 1 | |
| pinegle | 131 21 | 52 29 | |
| pinego | 61 11 | 64 29 | |
| pinga | 101 40 | 14 20 | s |
| port de los leenes | 318 | | |
| piramides | 173 11 | 20 21 | |
| pisa | 40 29 | 43 41 | |
| pizan | 73 0 | 51 29 | |
| plata | 345 0 | 19 51 | s |
| plimouth | 21 11 | 50 51 | |
| ploosko | 48 11 | 52 41 | |
| plotzco | 57 29 | 57 41 | |
| podolia reg | 59 0 | 49 29 | |
| poictiers | 26 29 | 47 21 | |
| poldauid | 20 5 | 47 55 | |
| polonia reg | 53 1 | 50 0 | s |
| poparopo an Iland | 128 41 | 16 29 | |
| Buen porto | 177 21 | 2 0 | |
| port de canoas | 239 21 | 36 41 | |
| port de caualos | 283 0 | 14 21 | |
| port de la conce | 45 41 | 24 21 | s |
| port desire | 313 0 | 47 41 | s |
| port famin | 302 51 | 53 11 | s |
| port fremo | 44 0 | 4 0 | s |
| port del gado | 42 11 | 3 51 | |
| port de S, Miguel | 240 29 | 35 2 | |
| port de negrillo | 296 51 | 17 11 | |
| port sallido | 186 41 | 3 0 | s |
| port santo | 10 0 | 32 29 | |
| port S. Vincent | 337 21 | 23 51 | |
| praga | 42 29 | 50 0 | |

| PQR | Longi. | Latit. | |
|---|---|---|---|
| preslaw | 45 11 | 51 11 | |
| preslaw | 49 41 | 49 45 | |
| portland | 22 40 | 50 40 | |
| primsberge | 48 30 | 55 11 | |
| prussia reg | 50 0 | 54 0 | |
| ptolomais | 66 41 | 29 40 | |
| punto del gada | 85 51 | 11 0 | |
| punto de s. Helen | 290 11 | 2 11 | S |
| punto de s. Helen | 325 21 | 37 30 | S |
| punt de s. Lucas | 252 29 | 23 29 | |
| **Q** | | | |
| Quanzu | 157 29 | 44 10 | |
| Quelinfu | 158 29 | 36 1 | |
| Quianfu | 144 41 | 42 29 | |
| Quiloa reg | 69 51 | 8 51 | |
| Quinzay | 153 0 | 40 1 | |
| Quito | 293 11 | 0 11 | |
| Quiuira | 233 0 | 43 40 | |
| **R** | | | |
| Raguſy | 49 29 | 44 1 | |
| Rameſes | 68 29 | 30 30 | |
| Rane | 352 41 | 62 41 | |
| Rauenna | 42 21 | 44 21 | |
| Rhodes | 61 41 | 37 21 | |
| Ryanrech | 94 41 | 40 0 | |
| Ribadeo | 19 21 | 43 21 | |
| Riga | 53 30 | 58 0 | |
| Reins | 30 35 | 49 12 | |
| Riuers | | | |
| Rio de arboledas | 331 41 | 1 41 | |
| Rio de S. Auguſt. | 350 0 | 15 30 | S |
| Rio de S. Barbara | 326 41 | 34 1 | |
| Rio del Braſill | 348 21 | 17 11 | |
| Rio de los camarones | 42 0 | 5 25 | |

| R | Longi. | Latit. | | S | Longi. | Latit. | |
|---|---|---|---|---|---|---|---|
| Rio de camaron | 315 0 | 44 29 | S | Sabarza | 154 51 | 45 0 | |
| Rio del campo | 42 29 | 2 51 | | Sableſtan reg | 14 0 | 34 0 | |
| Ria de cano | 298 41 | 33 11 | | Sabron | 84 51 | 45 11 | |
| Rio dangla | 42 29 | 0 41 | | Saendebar | 174 41 | 35 51 | |
| Rio dulce | 316 29 | 52 0 | | Sagatin | 95 29 | 58 21 | |
| Rio de s. demingo | 353 0 | 7 51 | | Sala | 49 41 | 48 0 | |
| Rio del eſtremo | 340 41 | 22 59 | S | Salamanca | 20 29 | 40 51 | |
| Rio de Flores | 287 19 | 29 0 | S | Salaſta | 72 41 | 41 51 | |
| Rio del gado | 34 21 | 6 21 | | Salabrema | 24 51 | 37 29 | |
| Rio de gigantes | 278 29 | 29 0 | | Salina | 45 0 | 38 29 | |
| Rio grande | 301 11 | 11 0 | | Salsburg | 42 0 | 48 21 | |
| Rio grande | 314 29 | 44 0 | | Salſtom | 32 21 | 62 0 | |
| Rio del guato | 284 29 | 29 29 | | Saluado | 321 21 | 5 0 | |
| Rio de la hacha. | 304 15 | 10 41 | | Samarchant | 109 0 | 44 0 | |
| Rio de S. Helena | 348 41 | 10 29 | S | Samaria | 72 21 | 47 41 | |
| S. Lawrens riuer | 318 51 | 53 0 | | Sanderſons Tow | 320 0 | 55 29 | |
| Rio de manitong | 48 21 | 10 0 | S | Hope Sanderſon | 326 21 | 72 41 | |
| Rio del oro | 10 21 | 22 29 | | Sandry | 162 51 | 53 0 | |
| Rio de palmas | 272 11 | 14 21 | | Sanſon | 20 41 | 43 21 | |
| Rio panuco | 271 51 | 22 29 | | S. Cruz | 334 21 | 43 29 | |
| Rio de perla | 292 29 | 29 0 | | S. Dauids | 20 0 | 52 0 | |
| Rio de la plata | 326 29 | 36 0 | | S. Domingo | 307 11 | 17 51 | |
| Rio primero | 327 41 | 45 0 | | S. George | 357 11 | 39 0 | |
| Rio ſanto | 300 29 | 3 0 | S | S. Helena | 24 29 | 16 0 | S |
| Rio de ſpirito ſan. | 381 29 | 31 0 | | Santiago | 264 29 | 20 29 | |
| The white Riuer | 308 11 | 51 21 | S | Santiago | 298 11 | 32 11 | |
| Rypon | 35 29 | 55 21 | | S. Iago | 175 29 | 2 0 | |
| Roan | 27 41 | 48 51 | | S. Iohn de luz | 25 11 | 43 21 | |
| Rochell | 25 29 | 46 41 | | S. Lazaro | 71 0 | 11 21 | S |
| Romey | 42 29 | 42 0 | | S. Lucar | 21 21 | 37 11 | |
| Rooſwick | 40 21 | 54 0 | | S. Lutia | 0 1 | 17 0 | |
| Roſtone | 72 11 | 57 0 | | S. Malo | 24 21 | 48 50 | |
| Ruſſia | 57 29 | 59 29 | | S. Maria | 82 29 | 17 0 | S |
| Rye | 27 29 | 51 1 | | S. Maria | 240 41 | 34 21 | |
| | | | | S. Maria | 0 19 | 56 0 | |
| | | | | S. Marica | 85 1 | 44 29 | |

| S | Longi. | Latit. | S | Longi. | Latit. |
|---|---|---|---|---|---|
| S Maries of Na. | 66 30 | 16 29 | Skalholt | 8 30 | 65 20 |
| S. Martha | 301 21 | 10 41 | Sibier reg | 99 20 | 59 30 |
| S. Martin | 321 11 | 51 0 | Sicilia | 45 0 | 37 30 |
| S. Martins Iland | 293 40 | 46 51 s | ſidon | 72 10 | 36 30 |
| S. Mathewes | 21 11 | 1 51 s | ſigiſtan reg | 105 0 | 31 0 |
| S. Michel | 60 50 | 65 29 | ſimiſo | 69 10 | 44 21 |
| S. Michaell | 0 50 | 38 5 | ſina | 70 0 | 41 41 |
| S. Miguell | 327 21 | 47 21 | ſina mountaine | 75 0 | 20 0 |
| S. Miguell | 291 41 | 6 11 s | ſinus mexico | 280 0 | 26 0 |
| S. Miguell | 268 0 | 24 0 | ſinus perſia | 85 0 | 29 0 |
| S. Miguell | 249 0 | 32 51 | ſion | 59 10 | 12 40 |
| S. Nicholas | 69 0 | 54 0 | ſipanto | 45 30 | 41 50 |
| S. Nicholas | 323 21 | 53 41 | ſiuill | 18 6 | 37 45 |
| S Nicholas | 2 2 | 17 0 | ſlaba | 55 50 | 58 41 |
| S. Petro | 64 29 | 0 29 | ſlauonia | 47 0 | 45 0 |
| S, pol de Lyon | 20 41 | 48 48 | ſlego in Ireland | 15 35 | 54 15 |
| S. Sampſon | 306 29 | 40 29 | ſlowoda | 68 20 | 64 30 |
| S. Vincent | 0 29 | 17 29 | ſlowoda | 86 30 | 58 51 |
| S. Vincent | 318 41 | 11 51 | ſlutzk | 59 0 | 52 58 |
| Sapom Iland | 107 11 | 0 29 | ſmirna | 60 21 | 40 29 |
| Sarachy | 84 29 | 44 11 | ſnauell | 2 30 | 64 21 |
| Saragoſa | 26 11 | 41 51 | ſolangi reg | 139 0 | 50 0 |
| Sardinia | 39 0 | 40 0 | ſolosky | 55 0 | 64 29 |
| Satyres Iland | 174 11 | 46 30 | ſorlings | 18 0 | 50 0 |
| Sauatapoly | 75 29 | 47 21 | ſpakado | 46 50 | 45 21 |
| Scarbrough | 24 51 | 54 51 | ſpier | 35 30 | 49 21 |
| Schotland | 25 0 | 60 0 | ſpina | 60 50 | 43 29 |
| Scotland | 20 0 | 57 0 | ſtad | 30 40 | 61 41 |
| Segedin | 49 0 | 47 11 | ſtapholt | 2 20 | 65 41 |
| Seames | 19 29 | 48 21 | ſtetin | 42 10 | 53 51 |
| Senega reg | 13 0 | 24 0 | ſtoby | 52 30 | 44 0 |
| Sernery reg | 106 29 | 33 29 | ſtocholme | 42 0 | 58 11 |
| Shabogliſher | 83 41 | 56 29 | ſtraights of tumachin | 74 30 | 73 11 |
| Shahaskik | 91 29 | 53 0 | ſeuedia reg | 40 0 | 60 0 |
| Shrewsbury | 22 35 | 52 55 | ſumatra an Iland | 134 0 | 0 0 |
| Shensk | 68 40 | 61 51 | | | |

| S T | Longit. | Latit. | | T | Longit. | Latit. | |
|---|---|---|---|---|---|---|---|
| Silly | 18 0 | 5 70 | | Texel in Holland | 31 0 | 53 15 | |
| Stert | 22 50 | 50 40 | | Theſſet reg | 20 0 | 29 10 | |
| ſweſt | 64 51 | 52 11 | | Thebet reg | 138 50 | 14 0 | |
| ſwineburne head | 25 0 | 59 51 | | Tholomon | 144 20 | 40 0 | |
| ſiria | 74 0 | 39 0 | | Tholouſe | 28 40 | 43 50 | |
| ſiracuſæ | 45 41 | 37 0 | | Thunnis | 67 40 | 32 0 | |
| ſouthampton | 24 5 | 51 11 | | Tigris a riuer | 84 0 | 34 30 | |
| T | | | | Tocros | 54 50 | 46 0 | |
| Tabaco | 322 11 | 10 41 | | Togora | 146 0 | 49 50 | |
| Tacan | 152 21 | 48 51 | | Tolledo | 22 20 | 39 40 | |
| Tagaranto | 143 29 | 2 21 | | Tollon | 34 5 | 43 20 | |
| Taguina an Iland | 154 29 | 5 21 | | Toul | 33 10 | 49 10 | |
| Taiona | 59 29 | 53 29 | | Toures | 27 30 | 47 50 | |
| Talabora | 312 0 | 26 21 | s | Trebiſonde | 74 30 | 44 40 | |
| Talcan | 85 0 | 47 0 | | Trent | 40 10 | 26 10 | |
| Tamaſa | 75 39 | 46 0 | | Triago an Iland | 278 40 | 21 0 | |
| Taranto | 48 0 | 40 29 | | Tribanta | 63 30 | 41 50 | |
| Tarapaca | 306 21 | 30 41 | s | Trin | 36 30 | 45 40 | |
| Tarbacan | 109 29 | 34 51 | | Trinidad | 355 20 | 19 10 | s |
| Targa reg. | 32 0 | 25 0 | | Trinidad | 295 50 | 21 20 | |
| Taragona | 29 29 | 40 41 | | Trinidad | 319 20 | 9 0 | |
| Tarſo | 71 21 | 40 0 | | Trinty harbor | 308 30 | 36 0 | |
| Tartar | 152 0 | 63 21 | | Tripolis antiqua | 44 21 | 30 20 | |
| Tartaria reg | 130 0 | 62 0 | | Tripolis in barb. | 45 21 | 30 30 | |
| Taskent reg | 129 0 | 49 0 | | Tripolis ſoria | 72 21 | 37 0 | |
| Tatracan | 55 0 | 44 51 | | Troia | 59 0 | 42 30 | |
| Tellin . | 13 29 | 54 41 | | Troy | 31 0 | 48 10 | |
| Tenariffe | 8 11 | 27 29 | | Tuia | 82 51 | 52 0 | |
| Tendue reg | 170 0 | 59 0 | | Tulla | 72 0 | 53 20 | |
| Teneſab | 46 51 | 61 11 | | Tuna | 41 51 | 64 30 | |
| Tercera | 358 23 | 39 0 | | Tunis reg | 40 0 | 36 0 | |
| Terra alta | 160 29 | 6 41 | s | Turchy reg | 110 0 | 47 0 | |
| Terra alta | 45 21 | 15 21 | | Turſon | 131 30 | 56 30 | |
| Ter de los fumos | 322 29 | 40 21 | s | Tyrus | 71 35 | 35 30 | |
| Tharſis | 115 21 | 49 0 | | Tzeroas | 79 50 | 49 20 | |
| Theſſalonia | 53 44 | 44 21 | | | | | |

| V | Longi. | Latit. |
|---|---|---|
| Vaiguy | 150 50 | 39 0 |
| Valentia | 29 20 | 39 41 |
| Varcano | 107 50 | 39 0 |
| Varon | 83 30 | 70 30 |
| Vaygats an Iland | 81 30 | 69 21 |
| Venice | 41 40 | 45 51 |
| Verdiſo | 59 50 | 45 0 |
| Verdun | 32 10 | 49 20 |
| Verma reg. | 133 0 | 21 30 |
| Varona | 40 40 | 45 50 |
| Viana | 17 30 | 42 0 |
| V atca | 87 50 | 59 30 |
| Vich | 81 40 | 53 50 |
| Vienna | 45 30 | 48 30 |
| Villac | 48 0 | 46 50 |
| Villa longa | 28 20 | 7 40 |
| Ville conde | 17 30 | 41 30 |
| Villna | 54 30 | 55 0 |
| Virginia | 302 10 | 36 0 |
| Viſſigrod | 61 30 | 51 30 |
| Bona Viſta | 4 30 | 15 30 |
| Buena Viſta | 308 40 | 40 11 |
| Buena Viſta | 177 30 | 13 30 |
| Vkkil | 53 10 | 57 0 |
| Vlm | 37 50 | 48 50 |
| Volga a riuer | 75 40 | 58 0 |
| Vpſalia | 42 50 | 60 0 |
| Vreamea | 23 50 | 46 0 |
| Vrgis a riuer | 85 50 | 53 20 |
| Vſiug | 79 30 | 61 30 |
| Vſtuſna | 67 0 | 59 20 |
| Vtuall | 42 40 | 62 50 |

| W X | Longi. | Latit. |
|---|---|---|
| Waersberghen | 39 1 | 57 30 |
| Wardhous | 50 30 | 70 29 |
| E. Warwickes for-land | 323 11 | 62 1 |
| Waterford | 17 15 | 52 16 |
| Count Warwicke ſound | 330 41 | 64 41 |
| Walkefield | 23 48 | 53 45 |
| Waſſilgorod | 81 50 | 56 41 |
| Waxon | 49 20 | 52 29 |
| Weimouth | 23 50 | 51 0 |
| Welichy | 96 30 | 56 0 |
| Weliki poyaſſa | 101 20 | 63 29 |
| Weliky tumen | 95 40 | 59 21 |
| Weliſz | 63 40 | 59 51 |
| Weroy | 36 50 | 68 41 |
| Weſel | 21 29 | 51 29 |
| Weſterhol | 40 29 | 67 41 |
| Whitbay | 24 29 | 55 0 |
| Wiborogh | 56 29 | 62 35 |
| Wight Ile | 25 11 | 50 29 |
| S. Hugh Williobie Iland | 55 0 | 75 0 |
| Winterton | 27 20 | 53 29 |
| Wologda | 73 50 | 59 29 |
| Wologda | 74 30 | 60 0 |
| Wollok | 68 31 | 55 50 |

X

| | | |
|---|---|---|
| Xaiel | 85 30 | 15 41 |
| Xandu | 168 40 | 55 41 |
| Xancs | 311 30 | 11 1 |
| Xaques | 282 0 | 20 29 |
| Xara | 130 0 | 17 1 |

| XYZ | Longi. | Latit. | |
|---|---|---|---|
| Xibuar | 116 0 | 46 30 | |
| Xiuxa | 301 30 | 12 0 | S |
| Xumete | 304 20 | 23 0 | |
| **Y** | | | |
| Yarmouth | 27 30 | 53 0 | |
| Yorke | 23 30 | 54 29 | |
| Yuagua | 303 30 | 21 0 | |
| Yuchcope | 22 56 | 56 20 | |
| **Z** | | | |
| Zacabadera | 140 40 | 13 11 | |
| Zacana a riuer | 60 40 | 13 0 | S |
| Zacatula | 269 40 | 20 0 | |
| Zacoton an Iland | 88 0 | 12 51 | |
| Zagatai | 105 0 | 45 0 | |
| Zahaspa | 101 20 | 42 29 | |
| Zalinca | 51 0 | 58 26 | |
| Zama | 49 30 | 14 0 | S |

| Z | Longi. | Latit. | |
|---|---|---|---|
| Zama | 74 41 | 11 41 | |
| Zanhega reg | 20 0 | 24 0 | |
| Zanziber | 73 52 | 6 29 | S |
| Zaphalonia | 52 0 | 38 29 | |
| Zara | 46 25 | 45 41 | |
| Zaradrus a riuer | 126 0 | 94 0 | |
| Zauan | 41 29 | 51 0 | |
| Zebeng | 138 41 | 35 41 | |
| Zebil a mountaine | 47 0 | 17 0 | S |
| Zedica | 48 0 | 29 29 | |
| Zegzeg reg | 36 41 | 14 41 | |
| Noua Zembla | 83 29 | 74 0 | |
| Zerigo | 56 0 | 36 0 | |
| Zigeck | 45 51 | 40 51 | |
| Zimbaos | 59 0 | 25 21 | S |
| Zingis | 76 11 | 49 29 | |
| Zodiala | 57 51 | 4 0 | S |
| Zoidalamel | 137 31 | 3 51 | S |
| Zuenziga reg | 25 0 | 25 0 | |
| Zuiatzko | 85 21 | 56 0 | |
| Zunbal | 39 31 | 37 30 | |

*Errors in the Table of sines.* 23 MA 59

| Deg | min | for | read | deg | mi. | for | read |
|---|---|---|---|---|---|---|---|
| 3 | 37 | 91 | 61 | 30 | 58 | 54 | 51 |
| 5 | 29 | 94 | 95 | 36 | 18 | 56 | 59 |
| 9 | 10 | 63 | 93 | 36 | 30 | 38 | 48 |
| 9 | 39 | 84 | 48 | 37 | 27 | 70 | 60 |
| 11 | 40 | 29 | 20 | 38 | 35 | 92 | 62 |
| 11 | 42 | 29 | 20 | 48 | 39 | 15 | 75 |
| 11 | 56 | 29 | 20 | 48 | 52 | 39 | 32 |
| 12 | 92 | 11 | 21 | 51 | 51 | 88 | 78 |
| 16 | 13 | 03 | 93 | 53 | 47 | 86 | 80 |
| 16 | 59 | 26 | 29 | 54 | 31 | 84 | 81 |
| 19 | 7 | 22 | 32 | 54 | 34 | 84 | 48 |
| 19 | 8 | 22 | 32 | 55 | 33 | 81 | 82 |
| 19 | 21 | 32 | 33 | 61 | 61 | 97 | 87 |
| 19 | 34 | 39 | 49 | 64 | 52 | 56 | 54 |
| 21 | 32 | 36 | 36 | 69 | 44 | 91 | 81 |
| 24 | 46 | 42 | 41 | 71 | 32 | 80 | 89 |
| 27 | 30 | 49 | 48 | 88 | 25 | 69 | 99 |
| 27 | 38 | 41 | 46 | | | | |
| 29 | 50 | 65 | 75 | | | | |